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WAR DEPARTMENT

TECHNICAL MANUAL

POWER UNIT PE-214-A

June 22, 1943

WAR DEPARTMENT
Washington, June 22, 1943

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TECHNICAL MANUAL
No. 11-913

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POWER UNIT PE-214-A

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DESTRUCTION NOTICE

WHY—

To prevent the enemy from using or salvaging this equipment for his benefit.

WHEN—

When ordered by your commander, or when you are in immediate danger of capture.

HOW—

1. Smash—Use sledges, axes, hand-axes, pick-axes, hammers, crowbars, heavy tools, etc.
2. Cut—Use axes, hand-axes, machete, etc.
3. Burn—Use gasoline, kerosene, oil, flame-throwers, incendiary grenades, etc.
4. Explosives—Use firearms, grenades, TNT, etc.
5. Disposal—Bury in slit trenches, fox-holes, other holes. Throw in streams. Scatter.
6. USE ANYTHING IMMEDIATELY AVAILABLE FOR DESTRUCTION OF THIS EQUIPMENT.

WHAT—

1. Smash—Thoroughly smash the entire unit with a sledge, axe, crowbar, or other heavy object, or by running over it with a tank or half track.
2. Cut—Cut all connecting wires and cables.
3. Burn—All instruction books, documents and shipping cases.
4. Bury or scatter—Any or all of the above pieces after breaking.

DESTROY EVERYTHING

SAFETY NOTICE

This equipment employs high voltages which are dangerous and may be fatal if contacted by operating personnel. Extreme caution should be exercised when working on the equipment.

OBSERVE ALL PRECAUTIONS AND SAFETY REGULATIONS.

If Power Unit PE-214-A is operated within a building, make certain that all exhaust connections are gas tight and that room is properly ventilated.

Stop the unit before attempting to work on it or removing gasoline tank filler cap. Avoid spilling gasoline on a hot engine. Carbon monoxide, contained in exhaust gases, is tasteless, odorless, and a deadly poison.

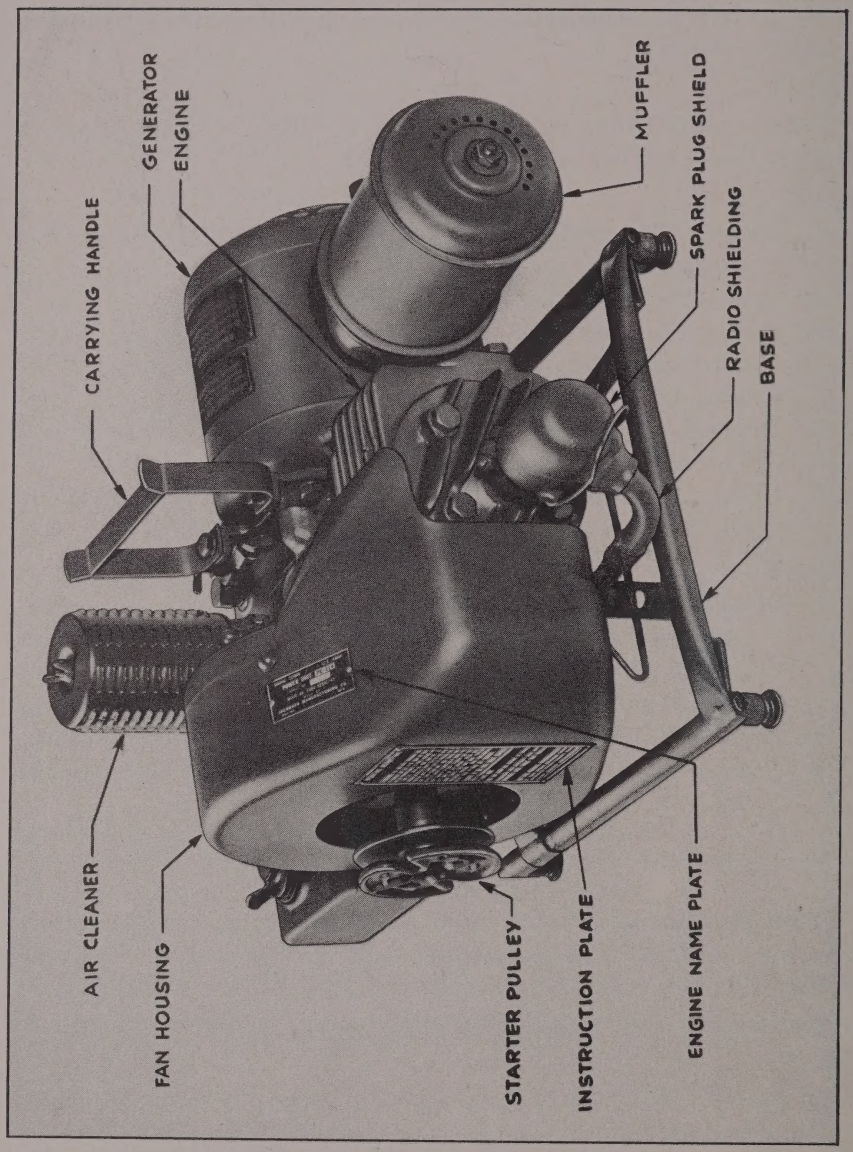

FIG. 1—POWER UNIT PE-214-A—FRONT VIEW

SECTION I
DESCRIPTION

1. General.—

Power Unit PE-214-A is a compact, lightweight, gasoline engine driven generator, of the manual starting type, with an output of 300 Watts, 120-240 Volt, 60-cycle, single phase alternating current. It is driven by a single cylinder, air cooled, two cycle gasoline engine, developing 1 hp at 3600 rpm.

The generator is of the revolving field type, directly coupled to the engine crankshaft, by means of a female spline coupling (153) which matches the splined extension on the engine crankshaft (9). A single 20-ampere twist-lock receptacle is located in the outer end casting of the generator along with three binding posts, two output and one ground marked G. **Do not use pliers on these posts.**

Tank M-343-A (181) with related fittings may also be issued with Power Unit PE-214-A. This component is supplied for use where the application calls for a longer continuous period of operation than permitted by the normal supply.

A carrying case (160), constructed of plywood, is provided for protection of the unit during transportation. Tool box and spare parts box are located in the carrying case. The entire equipment is painted olive drab.

Overall dimensions of the complete unit are:

Length	Width	Height
23¼	19¼	16

The net weight of the power unit only as it is ready for field service is 39¾ lbs. with fuel tank empty.

The net weight of the complete power unit, including tools, spares and case is 86¾ lbs.

2. Components.—

Power Unit PE-214-A is comprised of the following components:

A.	Carrying Case	CS-98
B.	Engine	GE-12
C.	Generator	GN-51
D.	*Tank	M-343-A

*Tank M-343-A is part of power unit PE-214-A only when specified on the order.

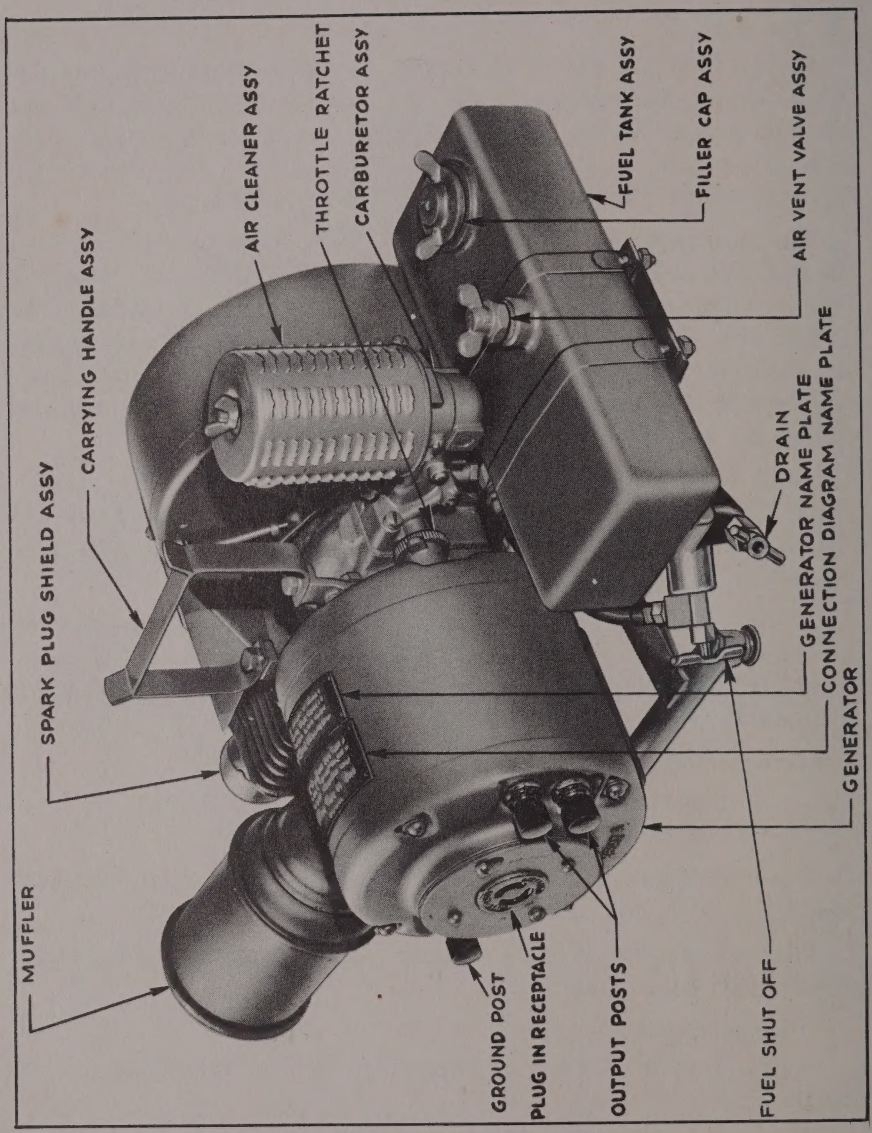

FIG. 2—POWER UNIT PE-214-A—REAR VIEW

3. Weights And Dimensions.—

Quantity	Item	Dimensions	Weight (Pounds)
1	Power Unit PE-214-A Complete	23¼ x 19¼ x 16	86¾ lb.
1	Power Unit only	18 5/16 x 14 1/32 x 10 29/32	39¾ lb.
1	Engine GE-12	18 5/16 x 12 x 10 29/32	20 lb.-6 oz.
1	Generator GN-51	6 x 6	19 lb.-6 oz.
1	Carrying Case CS-98	23¼ x 19¼ x 16	42 lb.
1	Tank M-343-A	4⅛ x 6⅝ x 10¼	1 lb.

SPARE PARTS

Quantity	Item
1	Piston and Connecting Rod Assembly
1	Set (3) Piston rings
2	Sets—all gaskets
1	Set—magneto breaker points
2	Magneto Capacitor
5	Spark Plugs
2	Air Filter Cartridges
1	Spark Plug Cable
2	Carburetor Reed Valves
1	Spare Starting Rope
1	Magneto Breaker arm

TOOLS

Quantity	Item
1	Pliers 6"
1	Open end wrench ⅜ x 7/16
1	Open end wrench ½ x 11/16
1	No. 8 Allen wrench
1	Double end feeler gauge .020-.030
1	Combination screw driver and socket wrench
1	One pint oil container
1	One quart fuel mixing can
1	Flywheel puller

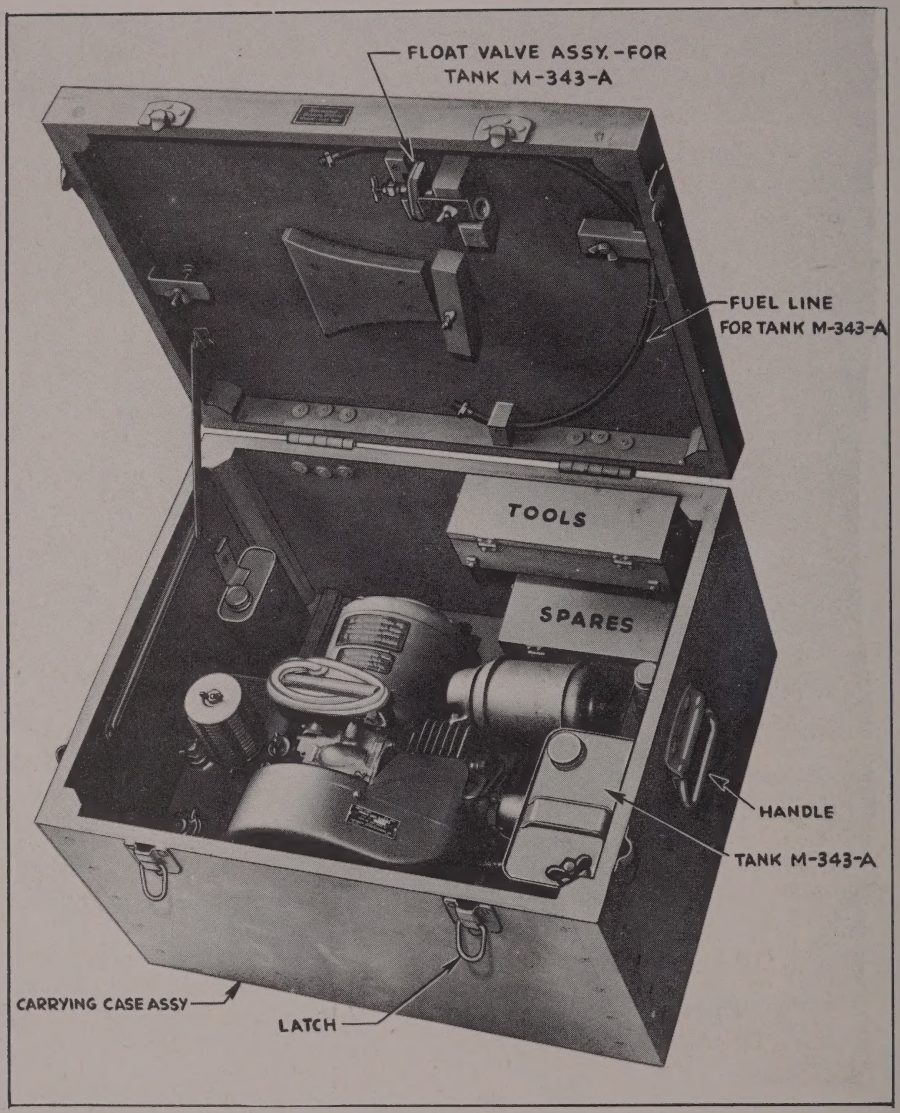

FIG. 3—POWER UNIT PE-214-A, IN CARRYING CASE

4. Sources of Power.—

a. Engine.—The prime mover is Engine GE-12-A. It is a single cylinder, two cycle, air cooled unit, with 2″ bore, 1½″ stroke, and delivers 1 hp at 3600 rpm. Piston displacement is 4.72 cubic inches. It is designed to operate satisfactorily on commercial gasolines with octane rating as low as 72. The unit will operate approximately two and one-half hours on one filling of the standard gasoline tank (75) or seven and one-half hours on Tank M-343-A (181).

b. Generator.—The driven unit is Generator GN-51-A. It is the revolving field type, with output of 300 watts, (100% pf) 120-240 volts,—60-cycle, single phase, alternating current. The generator will deliver between 112 and 128 volts at its rated speed of 3600 rpm when connected for 120 volts.

The voltage output without load should be approximately 128 volts; while at full load of 300 watts (100% pf), the voltage output will be approximately 112 volts. The output will vary between these values, depending upon the applied load.

When connected for 240 volts, the output will vary correspondingly.

The generator consists of a moving and a stationary member. The stator [(158) (stationary member)] consists of a stack of sheet steel punchings, slotted to receive windings of copper wire. Alternating current is generated in this winding through the rotation within its field of the rotor [(156) (moving member)] which consists of cylindrical permanent magnet, mounted on a shaft and supported in the center of the field made up of the stationary member of the generator.

c. Magneto.—Ignition is supplied by a high tension flywheel type magneto. This consists of a rotor [(34) (moving member)] and stator plate [(35) (stationary member)] mounted directly on the engine crankcase.

d. Carburetor.—The carburetor (89) is of the vacuum lift type, drawing fuel through a connecting line directly from the gasoline tank.

e. Air Cleaner.—The air cleaner (72) is of the replaceable cartridge type. Its function is to prevent the entry of foreign matter into the engine.

f. Governor.—The governor is of the pneumatic type and is operated by an air blast created by the magneto rotor fins. The governor vane (3), located over the rotor fins, is actuated in movement by the air current, and in turn, influences control of the carburetor butterfly valve through a linkage coupling arrangement to the carburetor throttle lever.

SECTION II

INSTALLATION AND OPERATION

NOTE. ALL DIRECTIONAL MOVEMENTS ARE TO BE MADE AS OBSERVED FROM REAR (FUEL TANK END) OF EQUIPMENT.

5. Installation.—

As soon as the packing has been removed, inspect the case and equipment for any damage that might have occurred during shipment. Should any items be unserviceable, report this fact immediately and procure replacements.

To remove power unit PE-214-A first release the two catches located at the front of the carrying case and lift up cover. Then unscrew the two wing nuts located on magneto side of engine mounting base (78). Lift unit straight up until it clears carrying case.

6. Preparation For Use.—

a. Fuel and Lubrication.—Lubrication of the entire engine is obtained by mixing the oil with the gasoline. The oil in the fuel mixture is carried into the cylinder where it lubricates cylinder wall, piston, piston rings, piston pin, connecting rod, and main bearings.

To prepare fuel, mix one-half pint S.A.E. 10 oil to one gallon of gasoline. (In this ratio, the proportion is 16 parts gasoline to one part oil.) Stir mixture thoroughly before pouring into gasoline tank. For single filling of fuel tank, fill the combination fuel tank cap and measuring device to the top with oil. Pour oil into fuel mixing can (123) and then fill can with gasoline. Stir contents or shake can well before pouring mixture into the fuel tank. Under no conditions are the oil and gasoline to be poured into fuel tank separately. **Never attempt to fill tank while unit is operating.**

b. Starting.—Check to make sure magneto high tension wire (25) is attached to spark plug. Open air-vent wing nut (162) and fuel line shut-off (83). Then with fuel in the gasoline tank follow these directions:

(1) Turn carburetor needle valve (60) counter-clockwise (to the left) to No. 5, or half open position.

(2) Move choke lever (66) to vertical position. Stand behind unit.

(3) Slip knotted end of starting rope (136) into notch on starter pulley (99) and wind around clockwise (to the right).

(4) Pull rope up sharply to the rear steadying unit with left hand on fan housing. Repeat until engine starts. (NOTE: If engine does not start on the 4th or 5th cranking, refer to Trouble Chart, pages 15 and 16.)

(5) Then move choke lever (66) to horizontal position. When engine is warm adjust needle valve (60) so engine runs smoothly. Under load it may be necessary to make a slight compensating adjustment on the needle valve.

For subsequent starting, the carburetor needle valve will not have to be disturbed. Merely use choke as described in starting instructions. This does not apply, however, where climatic conditions are extremely cold. In that case, the needle valve should be opened fully for starting.

c. Flooded Engine.—Choking the engine too much when starting will flood it. This is particularly true when starting a warm engine. To overcome a flooded condition, first close fuel line shut-off (83). Open drain cock (133) underneath crankcase and crank engine over a few times. When drained, close drain cock (133) and open fuel line shut-off (83) before cranking. Remove and dry spark plug before again attempting to start the unit.

d. Stopping.—To stop engine, close fuel line shut-off (83).

e. Tank M-343-A Installation.—Carried in the top of case (160) when Tank M-343-A is furnished is float valve assembly (170) and fuel line (180). To install these items, remove filler cap assembly (169) from standard fuel tank and screw float valve assembly (170) in its place. Connect one end of fuel line (180) to shut-off cock (178) in float valve assembly, the other end in shut-off at base of Tank M-343-A (181). Be sure to open shut-off valves and air vent on top of Tank M-343-A (181). For illustration of Tank M-343-A (181) installed see Figure 4, Page 12.

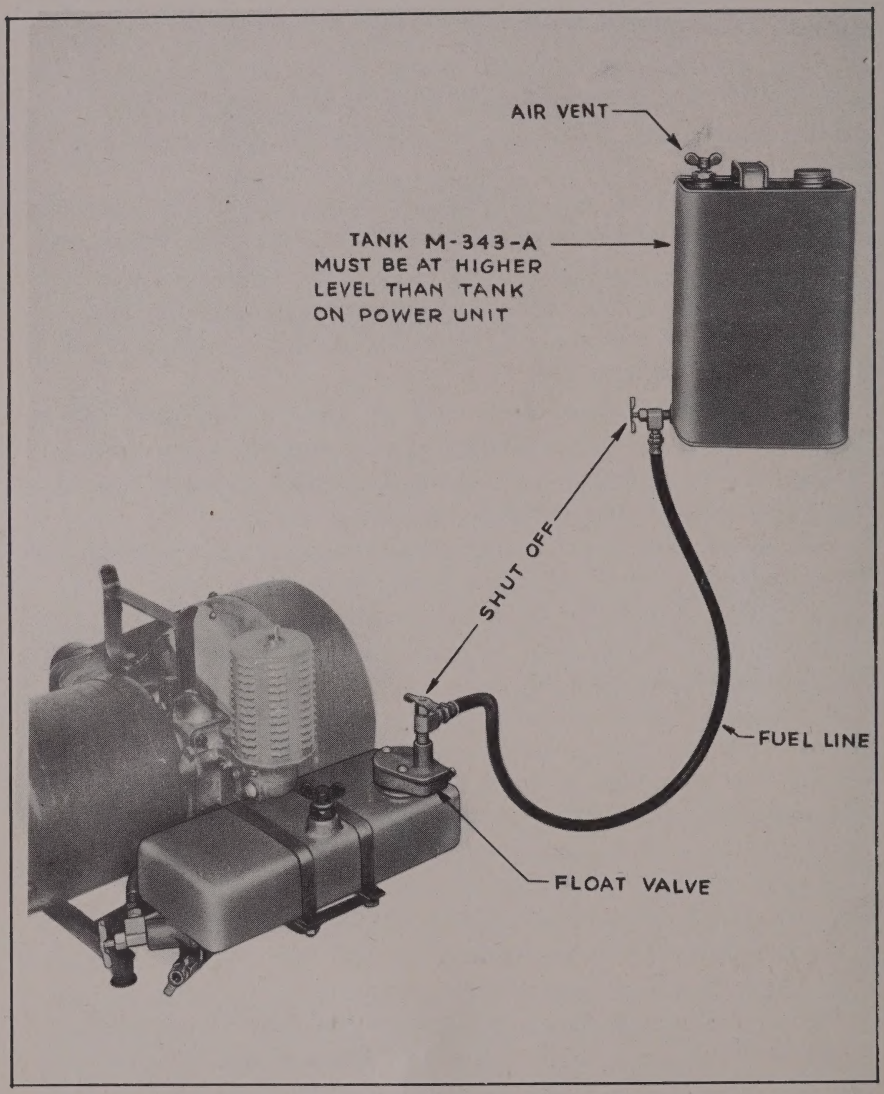

FIG. 4—TANK M-343-A CONNECTED UP

ALWAYS CLOSE FUEL LINE SHUT-OFF WHEN TRANSPORTING EQUIPMENT.

Note. Except in cases of extreme emergency, under low temperature conditions, always operate equipment without load for warm up period of about five minutes before applying load.

7. Operation.—

Power Unit PE-214-A is intended to furnish power for field communications equipment and is designed to deliver 300 watts, alternating current at 120-240 volts, 60-cycle, single phase. The unit should not be overloaded more than ten percent and should not be operated continuously at any overload.

To operate field communications equipment, cord from equipment should be plugged into receptacle in end of generator. (See Fig. 2, Page 6.)

a. Engine Operation.—(See paragraph 6, Page 10.)

b. Generator Operation.—CAUTION:—BE SURE GENERATOR IS CONNECTED FOR DESIRED VOLTAGE BEFORE OPERATING. (See Fig. 5, Page 14.)

There are only two precautions that need be observed in operating the generator:

(1) Be sure that the connections in the outlet box are properly made for the desired voltage according to diagram. (Fig. 5, Page 14.)

(2) Be sure that generator is not overloaded or short circuited for long periods of time. The generator will stand short periods of overload and may even be loaded continuously to 350 watts without damage, but greater overloads or short circuits for long periods of time will overheat and destroy the windings.

c. Voltage Change Instructions.—The windings of the generator are so arranged that by reconnection (See Fig. 5, Page 14) either 120 or 240 volts may be obtained. To change the voltage, first remove outlet cover (155) on the end of generator by loosening the two fastening screws (197). Then follow these directions:

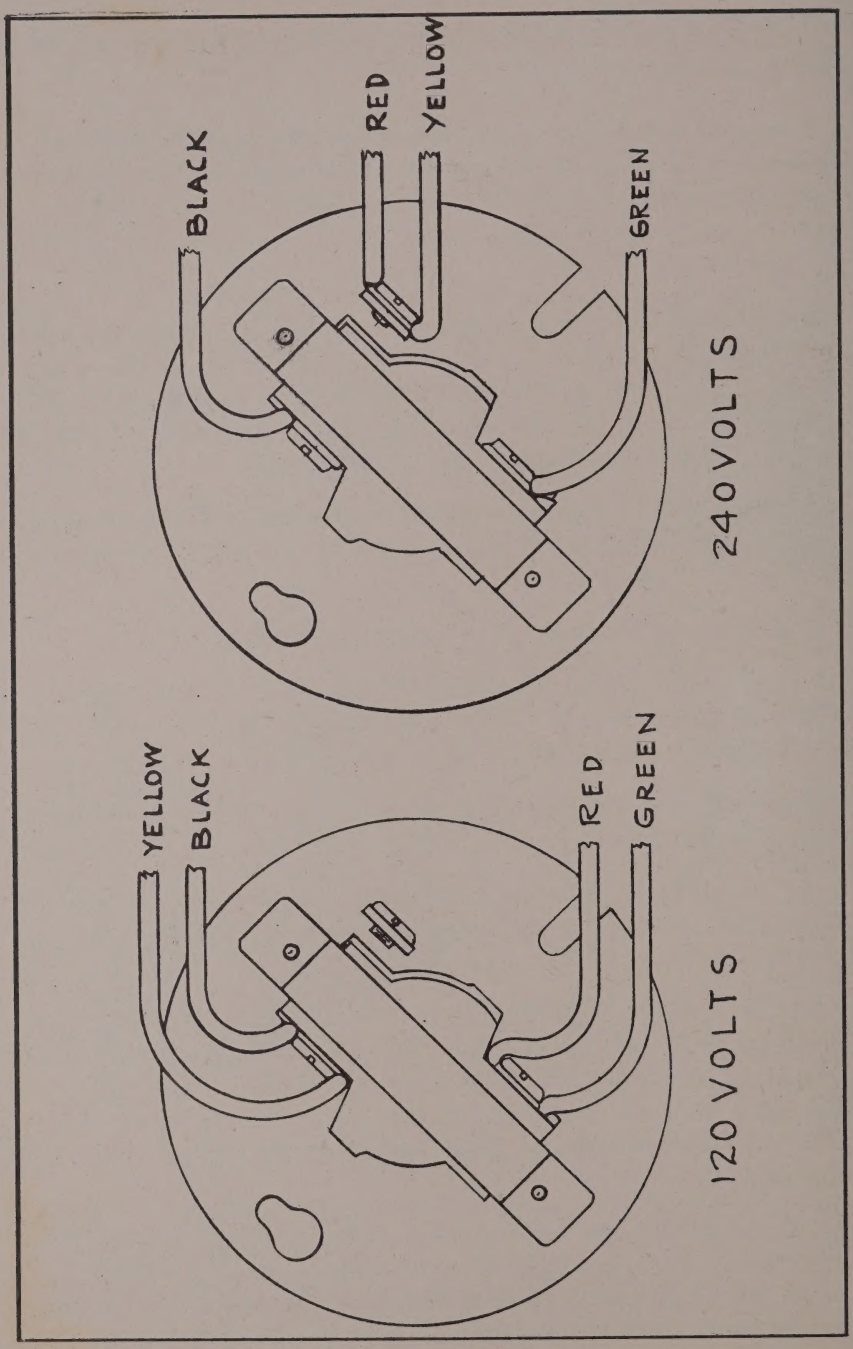

FIG. 5—POWER UNIT PE-214-A, VOLTAGE RECONNECTION DIAGRAM

(1) If generator is connected for 120 volts and 240 volts is desired, loosen the two screws (199) on the outlet on the back of the cover and remove the Red and Yellow leads. (These are the only leads which have open type terminals and can be removed without removing terminal screws.) Place both Red and Yellow leads under the head of the extra terminal screw beside the outlet and tighten all three screws.

(2) If generator is connected for 240 volts and 120 volts are desired remove the Red and Yellow leads from the extra terminal screw beside the outlet. Fasten the Red lead under the head of the screw on the outlet to which the Green lead is fastened. Fasten the Yellow lead under the screwhead on the outlet to which the Black lead is fastened.

Tighten all three screws before replacing outlet plate.

8. Troubles, Causes, Remedies.—

Engine troubles usually are: fails to start, hard to start, runs and stops, not up to speed (3600 rpm), overheats and loss of power. In locating engine trouble it is always advisable to install a new spark plug first to see if this corrects the difficulty. If it does not, leave new plug in while checking further.

SYMPTOM	POSSIBLE CAUSE	CHECK	REMEDY
a. Engine			
Fails to start or hard to start	No fuel in tank	Fuel tank	Fill
	Fuel line shut-off not open	Shut-off valve	Open
	Air vent not open	Air vent	Open
	Defective spark plug	Spark plug	Replace
	Carbon across spark plug electrodes	Spark plug	Clean
	Spark plug point gap too wide	Spark plug	Adjust to .030
	Obstruction under carburetor air valve	Carburetor air valve	Remove See Para. 11, Page 26
	Obstruction under Carburetor reed valve	Carburetor reed valve	Remove See Para. 11, Page 26
	Wet spark plug	Spark plug	Dry
	Water or dirt in fuel	Fuel tank	Drain, clean and refill
	Carburetor nozzle clogged	Carburetor	Clean out
	Cylinder port holes plugged	Cylinder	Clean out See Para. 11, Page 30
	Muffler plugged	Muffler	Clean out See Para. 11, Page 30

SYMPTOM	POSSIBLE CAUSE	CHECK	REMEDY
	Magneto points out of adjustment	Magneto	Adjust gap to .020 See Para. 11, Page 22
	Broken high tension cable	Magneto Cable	Replace See Para. 11, Page 25
	Defective capacitor	Magneto	Replace See Para. 11, Page 25
	Defective coil	Coil	Replace See Para. 11, Page 25
	Engine flooded	Crankcase drain valve	Open and drain See Para. 6, Page 11
	Engine not up to speed	Engine speed	Increase to 3600 rpm See Para. 11 Page 27
	Incorrect fuel mixture	Gas tank	Drain and refill
	Spark plug gap too wide	Spark plug	Adjust to .030
	Engine port holes partially plugged	Cylinder	Clean out See Para. 11, Page 30
	Muffler partially plugged	Muffler	Clean out See Para. 11, Page 30
	Carburetor needle valve not properly adjusted	Needle valve	Reset See Para. 6, Page 11
	Carburetor choke lever not in running position	Choke lever	Move to horizontal position See Para. 6, Page 11
Engine Overheats and lacks power	Port holes plugged	Cylinder	Clean out See Para. 11, Page 30
	Muffler plugged	Muffler	Clean out See Para. 11, Page 30
	Piston and cylinder head carbonized	Cylinder and piston head	Clean
	Wrong type spark plug	Spark plug	Use Champion J5 or equivalent
	Carburetor needle valve improperly adjusted	Needle valve	Readjust See Para. 6, Page 11
	Overload on generator	Engine speed	Increase to 3600 rpm
b. Generator			
Fails to generate current			Replace
Fails to generate rated output	Engine not up to speed	Engine speed	Increase to 3600 rpm
	Wires not connected properly for desired voltage	Connections in outlet box	Re-connect See Para. 7, Page 13

SECTION III
FUNCTIONING OF PARTS

9. Generator Theory.—

The generator of Power Unit PE-214-A is of the 60-cycle alternating current type. This is an electric current which starts at zero, increases to a maximum in one direction, decreases to zero, increases to a maximum in the opposite direction, decreases to zero and repeats this cycle 60 times in one second.

This generator is known as the rotating field type and requires no commutator or brushes.

The rotor of the generator is a permanent magnet in the form of a cylinder and is made of a material which will take a strong magnetic charge. This magnet is surrounded by a copper structure which prevents it from losing its magnetism if the generator is accidentally short circuited.

Fig. 6, Page 18, is a simplified picture of the rotor showing the lines of magnetic flux leaving the north pole and entering the south pole. When such a rotor is placed in a stator with copper wire windings in its slots (as shown in Fig. 7, Page 18), the magnetic flux lines pass through the iron of the stator and between its wires. When the rotor is turned by the engine, these magnetic flux lines sweep past the wires and generate a voltage in them, the value of which depends on:

a. Strength of the magnet

b. Number of turns of wire

c. Speed of rotation

The direction of the voltage generated in the wires depends on whether a north or south pole is sweeping past them. This is the reason for reversal of current each cycle mentioned in the first paragraph. If the rotor makes 60 revolutions in one second there will be 60 reversals or 60 cycles. That is what takes place when the engine runs at 3600 revolutions per minute.

10. Principle of the Two Cycle Engine.—(See Fig. 8, Page 19.)

Figure A. The piston, on its up-stroke (compression) draws a charge of fuel into the crankcase through a reed valve attached to rear of the carburetor. At the same time, a charge previously drawn into the crankcase and by-passed into the combustion chamber is compressed.

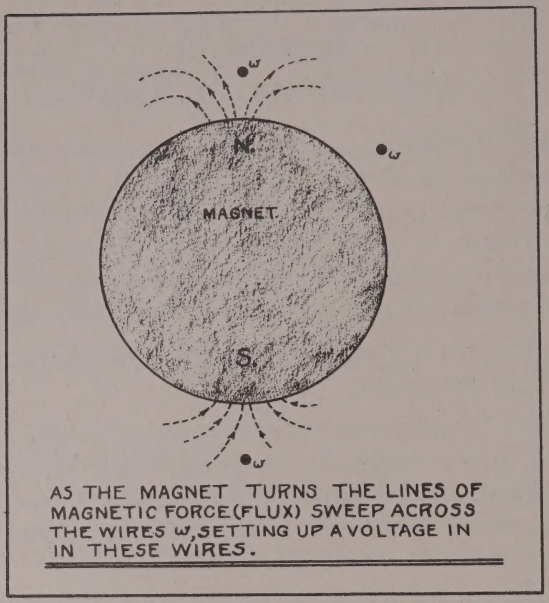
N.
MAGNET.
S.
AS THE MAGNET TURNS THE LINES OF MAGNETIC FORCE(FLUX) SWEEP ACROSS THE WIRES ω, SETTING UP A VOLTAGE IN IN THESE WIRES.

FIG. 6

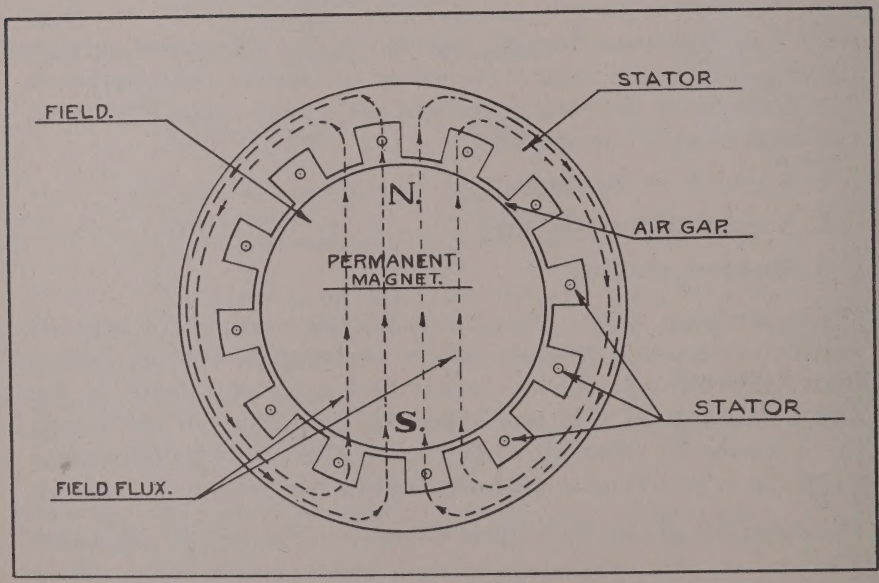
FIELD.
STATOR
N.
AIR GAP.
PERMANENT MAGNET.
S.
STATOR
FIELD FLUX.

FIG. 7

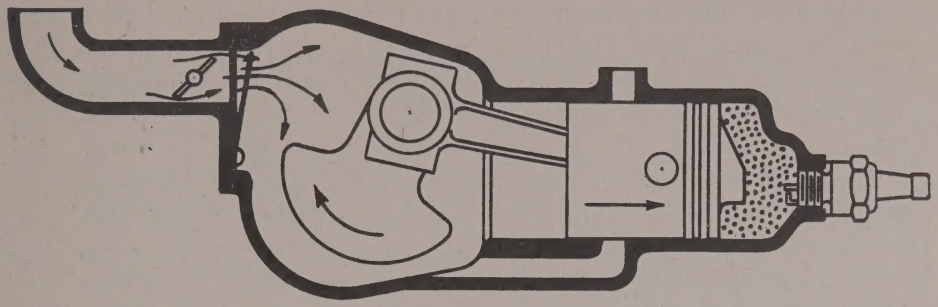

FIG. A

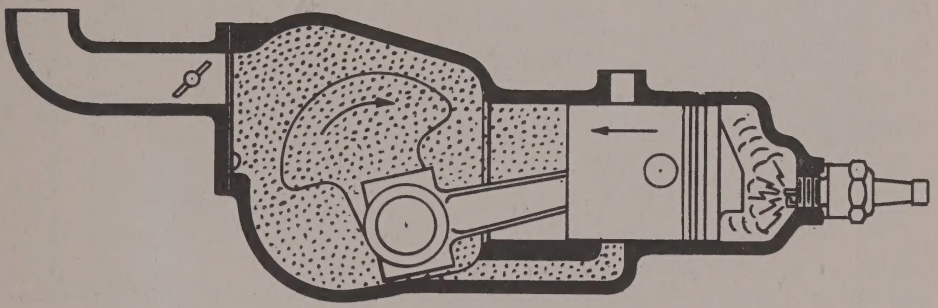

FIG. B

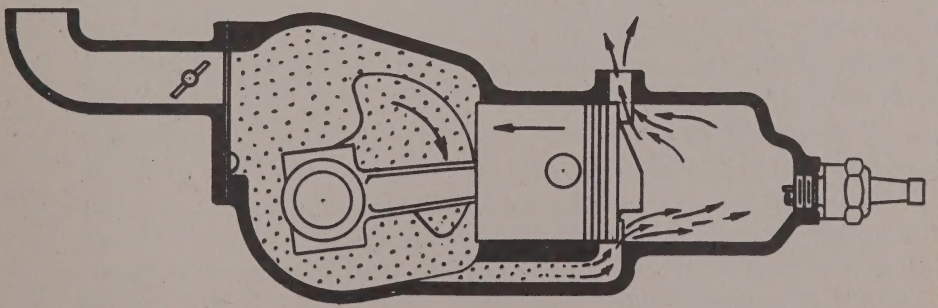

FIG. C

FIG. 8—PRINCIPLE OF 2 CYCLE ENGINE

Figure B. The charge in the combustion chamber is ignited when the piston is ⅛ inch from top dead center. The expansion of the burning gases forces the piston down on its power stroke. The descending piston compresses the charge previously drawn into the crankcase.

Figure C. Near the bottom of its downward (power) stroke the piston uncovers the exhaust ports, releasing the exhaust gases. At almost the same moment, the piston uncovers the intake ports, permitting the fuel charge compressed in the crankcase to rush through into the combustion chamber.

One power stroke is accomplished to every revolution of the crankshaft or two strokes (1 up and 1 down) of the piston.

SECTION IV
MAINTENANCE

11. Engine.—

This section deals mainly with minor points of inspection and adjustment that can be performed in the field. To insure satisfactory operation of the unit, follow directions thoroughly.

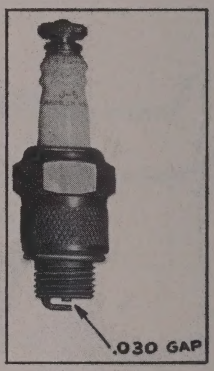

FIG. 9—SPARK PLUG

a. Spark Plug.—If engine fails to start, starts hard or misses, the spark plug may be damaged or dirty. Remove from cylinder head and shield (92), first disconnecting magneto high tension wire (25). Then reattach high tension wire to spark plug and lay plug on the cylinder. Spin motor to check spark. If no spark occurs at the spark plug points, clean out plug or install a new one.

Always use Champion J5 spark plug, or one in equivalent heat range. Point gap should be .030. Make certain gasket (108) is on spark plug when installing in engine. (See Fig. 9, Page 20.)

It is extremely important when plug is dirty to thoroughly scrape out all carbon, brownish lead deposits and loose particles.

b. Magneto.—It is recommended, if there is an indication the magneto is causing trouble, that a test be made before attempting to repair it. If the engine refuses to start after it is determined the spark plug is all right, check magneto by holding high tension wire (25) $\frac{3}{16}$″ away from a point on the engine (See Fig. 10, Page 21). When the engine is cranked in the usual manner, a properly performing magneto will have a spark output strong enough to jump the prescribed gap.

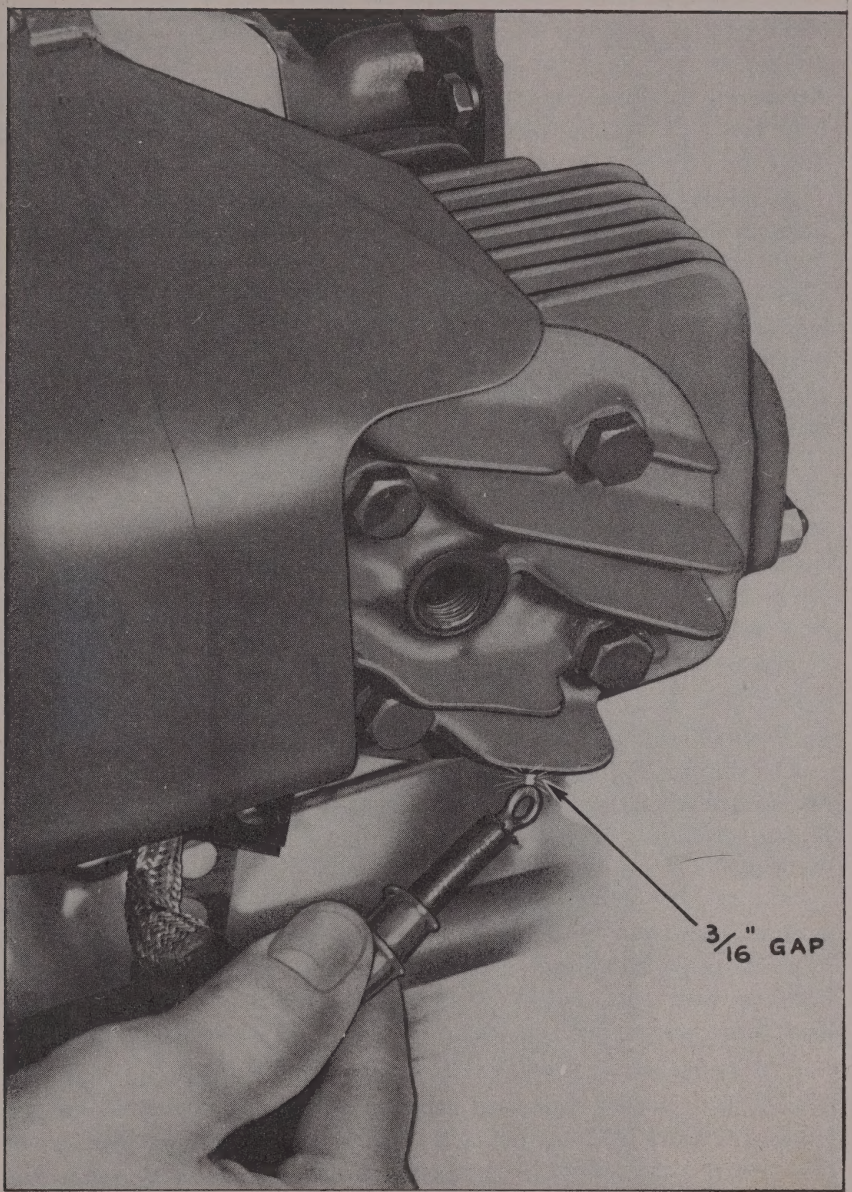

FIG. 10—TEST FOR SPARK OUTPUT

The only adjustable part on the magneto is the breaker plate (31) which provides adjustment for the breaker points.

To adjust breaker points, first remove housing (1). Then to adjust points, unscrew starter pulley (99) from the crankshaft. Screw on flywheel removal tool (119) supplied with equipment and tap tool on the end to loosen flywheel (34), which should then be removed to provide access to points.

To adjust points, turn engine clockwise (to the right) by hand, until breaker points are fully open. Check opening (See Fig. 11, Page 23) with feeler gauge (125). Correct opening is .020″. (Note: Although contact points remain open during the entire travel of the cam (21) from the breaking edge, being closed only while the flat section of the cam is passing the breaker arm (20) fibre, the cam must be positioned so the breaker arm fibre rests on the highest point of cam when gauging point opening.)

If points need resetting, bend down contact plate lock (27) (See Fig. 11, Page 23), loosen lock nut (30) which holds breaker plate (31) in position, and move plate up or down as might be necessary to obtain proper point opening. After setting is accomplished, be sure to tighten lock nut (30) and bend ear of plate lock against flat of lock nut so it can not loosen up.

The breaker plate setting should be made only in the manner prescribed. At no time should the fixed contact (On plate 31) be loosened or breaker arm (20) bent to provide adjustment.

The moving contact is integral with breaker arm. In replacing breaker arm (20), make certain breaker arm bushing is in place. If one or other of contact points needs replacing, it is recommended both be changed at same time to insure satisfactory operation. The breaker arm bearing is packed with a cam lubricant at the time of assembly and should not require additional lubrication. A small amount of this lubricant is also packed on the breaker arm cam wiper (36) and wipes off on cam surface, providing permanent lubrication between these rubbing surfaces.

Uneven or pitted contact points may be restored to a true even condition by using a smooth carborundum or dressing stone. Be sure to remove all dust particles. However, points in this condition are recommended to be replaced. For minor dressing, a fine grain sandpaper such as No. 00 can be used.

c. To Time Magneto.—If for any reason, the magneto assembly is removed from the engine, these directions covering timing should be followed.

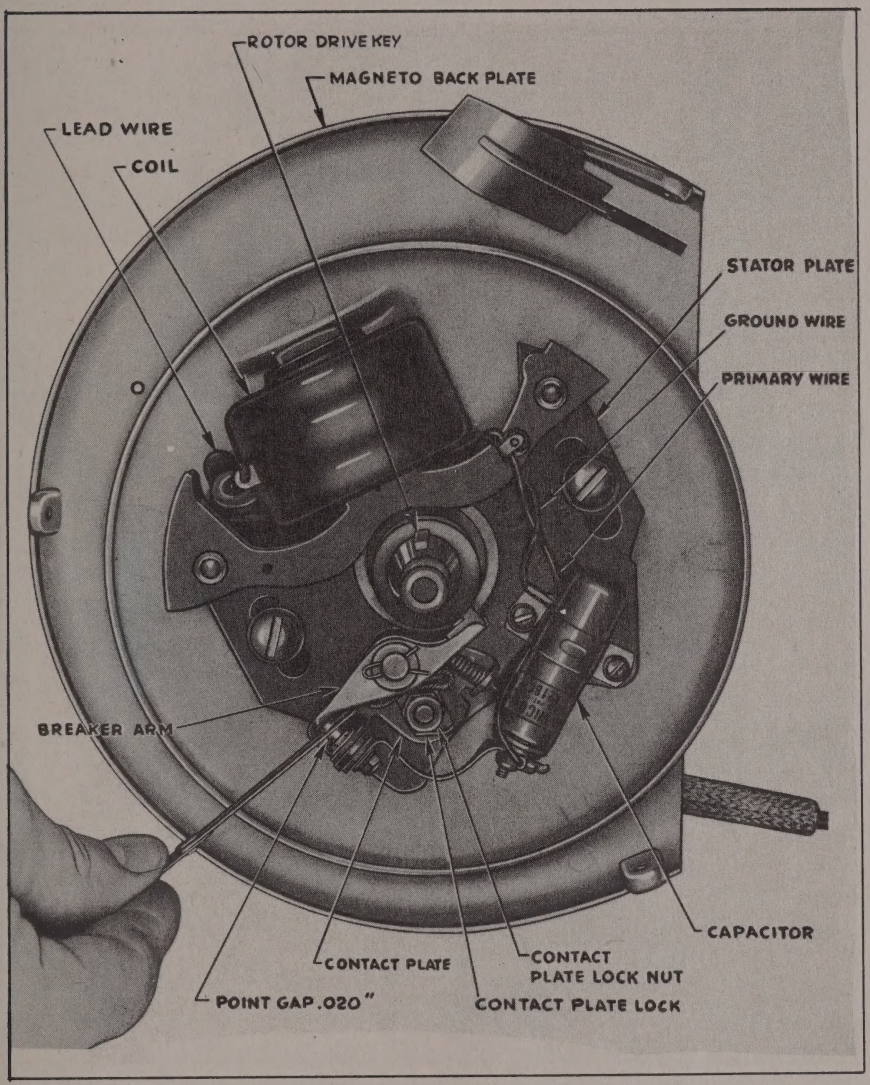

FIG. 11—MAGNETO POINT ADJUSTMENT

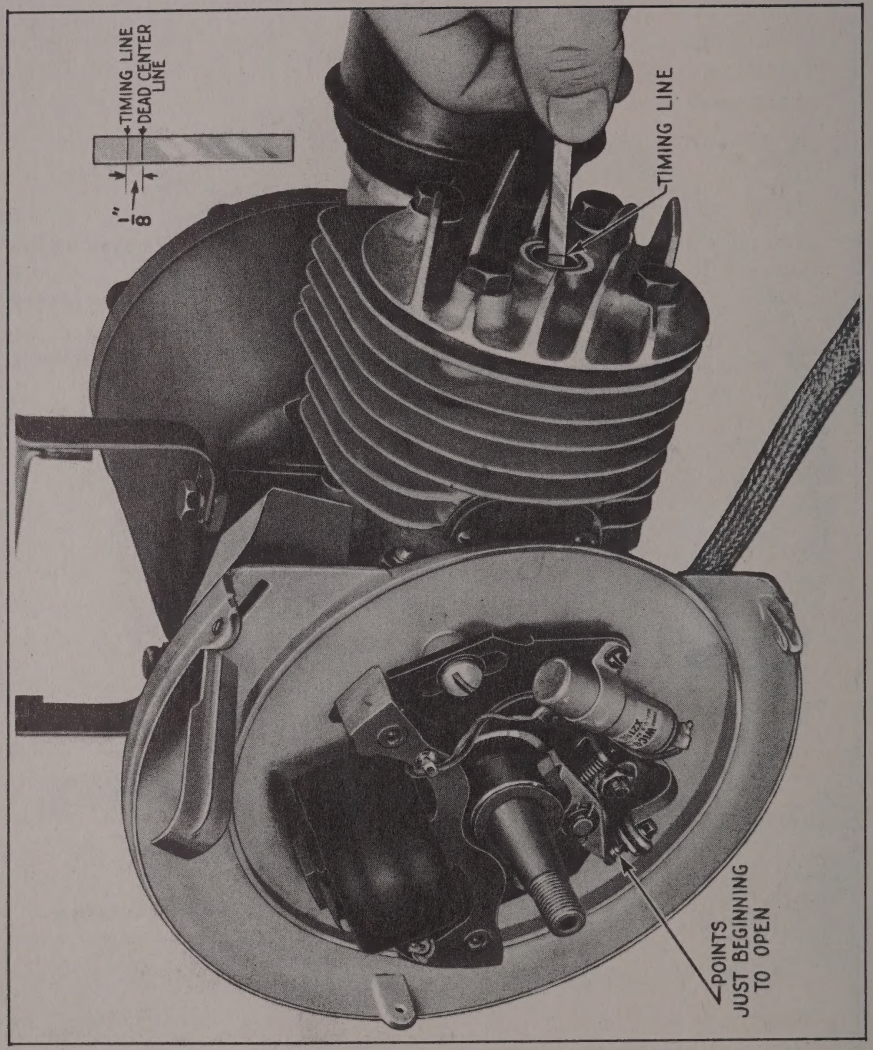

FIG. 12—MAGNETO TIMING

(1) Check point opening as outlined under magneto directions (Paragraph 11, Page 22). Remove spark plug. Turn crankshaft (9) in direction of engine rotation (to the right) until piston reaches top dead center.

(2) Insert a small rod through spark plug hole in cylinder head (97) until it touches top of piston. Scribe a line on the rod flush with top of spark plug hole. Then withdraw rod and scribe another line up 1/8" from dead center mark (See Fig. 12, Page 24). Next, turn engine in opposite direction of rotation (to the left) about one-quarter turn.

(3) The rod should again be inserted through spark plug hole until it touches top of piston. Then turn engine in direction of rotation (to the right) until top mark on rod is flush with top of spark plug hole.

(4) Move stator plate (35) until points just begin to break. Tighten plate by means of the two round head screws, which lock plate in place. Recheck to determine if piston is 1/8" from top dead center when points just begin to break. If setting is exactly as described, the timing is then so a spark occurs when piston is 1/8" from top dead center.

(5) Replacing high tension wire. A chafed or broken cable (25) which is a cause for continuous or intermittent misfiring, should be replaced. The high tension cable should be stripped back about 1/2" on the magneto end, twist strands together and slip through hole in bracket attached to coil. Bend strands around bracket so cable cannot work out (See Fig. 11, Page 23).

It is essential that the bare end be kept short and close to each surface after cable is in place. (Do not solder cable to coil.)

(6) Coil and Capacitor. If no spark or a weak spark occurs after adjusting the contact points, the trouble is likely to be in the coil (33) or capacitor (22), although failure of these parts is not a common cause of difficulty. Replace either one or both to obtain a strong spark only after checking the spark plug, high tension wire connection and magneto contact points. (Coil is furnished as assembly only with laminated core.) In replacing the coil assembly, the three machined faces of the laminations must line up exactly with the three machined bosses of the stator. Screws must be tightened securely.

(7) Magnet. Integrally cast in the rim of the rotor (34) is the magnetic unit, which concentrates a powerful magnetic charge within a small volume. By virtue of its ability to retain indefinitely this high magnetic concentration, the unit is able to provide the magneto with extraordinary high spark output through its entire life. Therefore, no trouble should be experienced with the magnet.

(8) Lubrication. The magneto should require no lubrication for a long period of service. For cam lubrication add a little vasoline or petrolatum to the cam wiper (36) after approximately 200 hours of operation. Do not use oil or a fluid lubricant as either can get on the breaker points and short them out.

d. Carburetor.—The carburetor needle valve (56) is correctly set at the time of assembly and should require no attention for some time. However, if, for any reason, the needle valve must be removed, follow these directions:

(1) Hold adjustment knob (60) with one hand, then loosen and remove hex acorn-nut (55) atop the knob with a wrench or pair of pliers. Unscrew adjustment valve by turning in counter-clockwise direction (to the left).

(2) When reassembling valve (56) to carburetor, turn it in a clockwise direction (to the right) in seat as far as it will go. Do not tighten hard against seat or damage might occur to seat and valve.

(3) With valve in seat as far as it will go, turn it back about one-quarter turn from this closed position. Replace spring (45) and valve adjustment knob with wing of knob against left hand side of stop. Screw on acorn-nut and tighten making sure valve does not move while this is being done.

If engine idles improperly or will not keep running, first check the fuel mixture for proper ratio of oil to gasoline; then muffler, exhaust and intake port holes for carbon accumulation. (See Para. 11, Page 30 and Figs. 13-14, Pages 28-29.)

If there is no restriction due to carbon and the carburetor is properly adjusted, and spark plug and magneto points correctly adjusted, remove the air cleaner (72) and examine the air check (67) located in carburetor bowl to see that small particles of foreign matter are not preventing the valve from closing. Should the air check valve be functioning properly, remove the carburetor and examine the reed valve (90) attached to carburetor on the back. Make certain that no foreign matter prevents this valve from closing or seating properly.

In reattaching carburetor make sure all connections are tight to prevent air leakage.

e. Air Cleaner.—The air cleaner (72) serves to prevent dust and grit from entering the engine and causing wear to moving parts. If equipment is operated under extremely severe and dusty conditions, the felt core (137) should be removed and washed out in gasoline, naphtha or acetone after about 30 hours of operation or oftener if conditions warrant. The filter core (137), after cleaning should be dipped in oil. Permit oil to drain off before assembling to cleaner. The filter core should also be examined periodically to see that no openings are present to permit entry of foreign matter. A leaky core should be replaced.

f. Governor.—No adjustments should be necessary to the governor, as it is correctly set for the requirements of the unit at the factory. No attention should be required except if governor housing (70) is removed for spring (64) replacement.

To remove governor housing and install new spring follow these directions:

(1) Remove governor link guard (128) by taking out the two screws holding it to magneto back plate.

(2) Disconnect fuel line (167) and then remove gas tank from unit mounting base.

(3) Uncouple governor link (130) and remove carburetor from engine.

(4) Loosen headless set screw (59) in governor spring barrel with wrench (134) and slip assembly from throttle shaft (65).

(5) In replacing governor spring, insert one end of spring into hole in governor housing. Slide the housing onto throttle shaft. Then line up other end of spring with hole in knurled speed adjusting wheel (61). Hold extension on governor housing in vertical position. Next hold throttle lever (65) extension up against stop or in wide open position. Then tighten headless screw in governor housing.

Check governor housing to determine no bind exists. It should move freely through entire range of travel.

If engine speed requires changing, turn knurled speed regulator (61) toward cylinder (counter-clockwise) to increase speed; the opposite direction (clockwise) to increase speed.

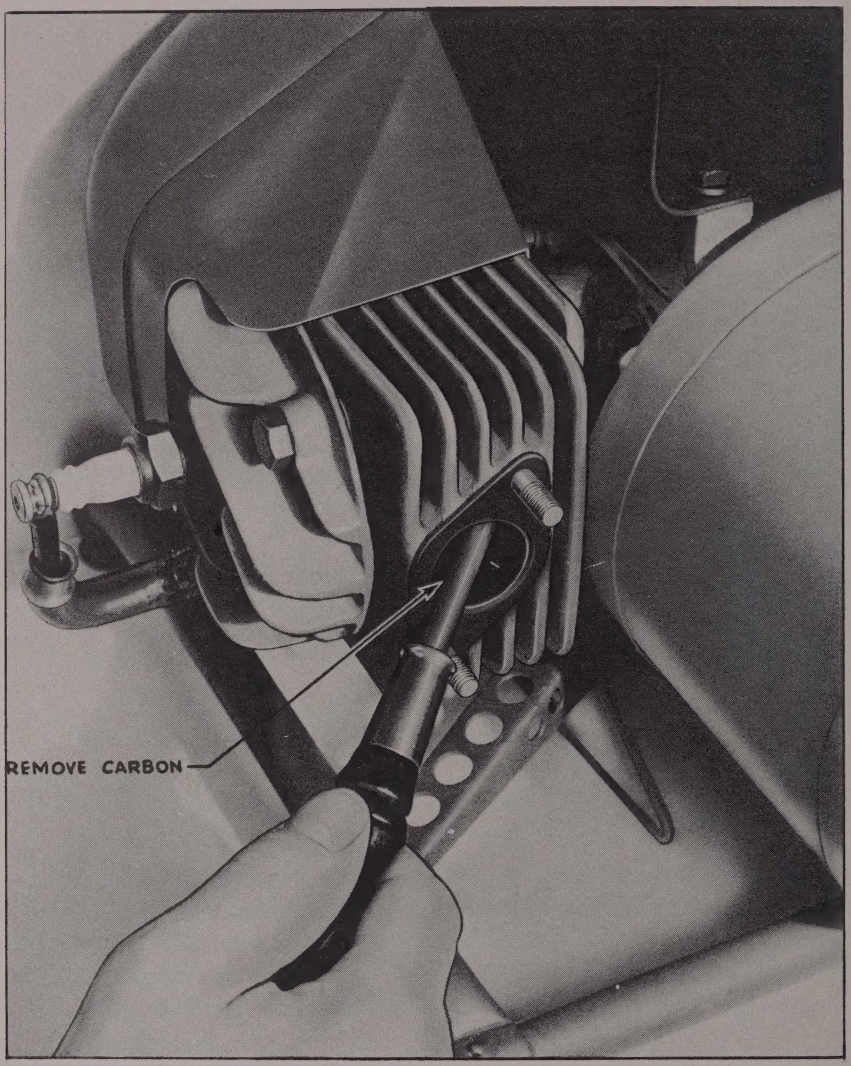

FIG. 13—CARBON REMOVAL—EXHAUST PORTS

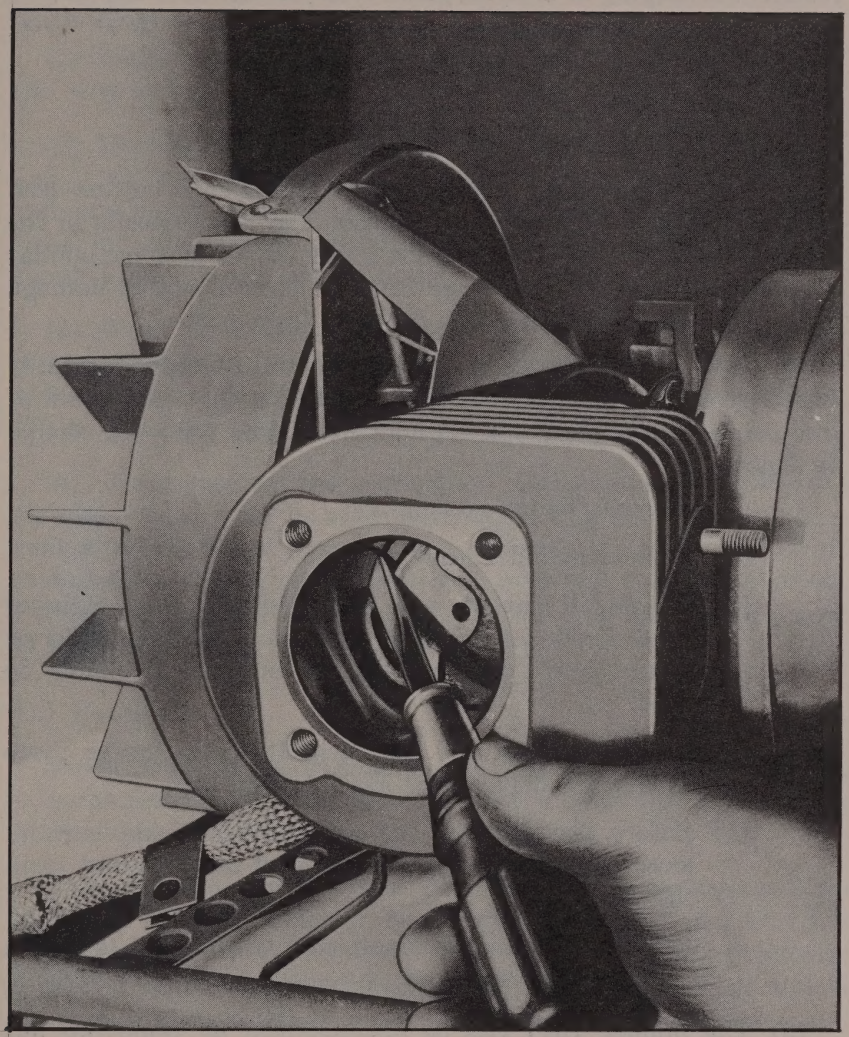

FIG. 14—CARBON REMOVAL—INTAKE PORTS

g. Carbon Removal.—It is advisable to make a periodic check of the engine exhaust and intake port holes, also muffler assembly, to determine that no carbon has built up at those points to restrict scavenging of exhaust gases from the cylinder and reduce power output. To check and remove carbon, follow these directions:

(1) Remove spark plug.

(2) Remove muffler.

(3) Turn engine over by hand until piston reaches bottom dead center. Examine exhaust ports. Carbon and lead deposits in the exhaust ports can be removed with screw driver or some similar instrument. (See Fig. 13, Page 28.) Be careful not to damage the piston when removing the deposits from ports.

(4) It is preferable when exhaust ports are found partially closed by carbon and lead deposits, to make a thorough check of the piston, intake port, and cylinder head. The following should be done:

(1) Remove the fan housing (1).

(2) Remove cylinder head (97).

(3) Scrape off carbon and lead deposits from cylinder head, inside of cylinder and top of piston. A screw driver, knife or other similar instrument should be used.

(4) Remove carbon and lead deposits from intake ports with screw driver (See Fig. 14, Page 29).

(5) Before reassembling the cylinder head make sure all loose particles of carbon and lead are removed from the engine.

NOTE: Small particles of carbon and lead if left in the engine may foul the spark plug in restarting.

(5) The muffler (37) can be disassembled by removing nut (185) and separating muffler shell (41) from head (38). Scrape carbon from inside the head. Clean carbon out of all inner and outer holes of shell. Make certain gasket (39) is all right before reassembly of muffler.

(6) Crank engine a few times before reinstalling muffler, to give carbon chips an opportunity to pass out of engine.

h. When Engine Fails to Start.—If, at any time, the engine should fail to start, check the following possibilities:

(1) Make sure there is at least one inch of gasoline in the fuel tank.

(2) Make sure that the air vent wing nut (162) is open and the vent clear.

(3) Damaged or dirty spark plug: Remove the spark plug. Lay it on the motor base with the high tension wire connected and spin motor to check spark. If no spark occurs at the points, clean out plug or replace it with a new one. The spark plug points should have a gap of approximately .030".

(4) Weak or intermittent spark: A weak spark is generally due to improper adjustment of the magneto points. Check point adjustment as directed in Magneto Adjustment instructions. (Para. 11, Page 22.)

(5) Loose gasoline line connection: Gas line packing nuts and all connections must be absolutely tight, as an air leak will prevent a full charge of gasoline from entering the motor and affect carburetion. Check all connections, including fuel line shut-off. Periodically tighten all connections. Draw up the packing nuts of the fuel line and shut-off if necessary.

12. Generator.—

Should the generator at any time fail to generate current it is recommended it be substituted with a new unit rather than attempt any field service.

Because Generator GN-51-A does not require the use of commutator, brushes, collector ring, etc., no maintenance instructions are necessary. However, if, at any time, the generator might require complete disassembly, follow directions as shown in Para. 15, Page 34.

13. Lubrication.—

Power Unit PE-214-A requires no lubrication other than the oil mixed with gasoline for the engine (See Para. 6, Page 10) and occasional lubricating of magneto cam (21) with vaseline or petrolatum. Do not use a fluid lubricant.

14. Procedure in case of failure.—

When the engine fails to operate and there is fuel in the gasoline tank, the spark plug, ignition and carburetor should be checked in the order named.

In locating engine trouble, replace the spark plug. If this does not correct the diffculty, leave it in place while checking further. Failure of the spark plug may be due to improper point gap or a cracked or dirty porcelain. Correct point gap is .030". Carbon or lead deposits on points may cause failure by shorting the spark plug.

Spark plugs are made in a variety of heat ranges to fit the requirements of different engines. For maximum operating efficiency it is important that Champion J5 spark plug or equal ($^{13}/_{16}$ Hex. body) be used.

If the spark plug points are wet, it is an indication the engine is being operated with too rich a fuel mixture or the ratio of gasoline to oil is not correct.

15. Dismantling.—

a. Engine.—To disassemble the engine for major repairs it is first necessary to remove the generator. This is accomplished by first removing the three hex. head cap screws (182) from back of mounting flange (98) and sliding the generator off engine crankshaft. Then for complete dismantling of engine follow these directions:

(1) Remove spark plug shield (92), then magneto high-tension wire (25) from spark plug (109). Next remove muffler assembly (37).

(2) The magneto housing (1) is next removed and then the starter pulley (99). Be sure to use flywheel removal tool (119) for this operation.

(3) Next remove stator plate (35) and magneto back plate (87).

(4) Uncouple governor connecting link (130). Disconnect gas line (167) and remove fuel tank (75) from mounting base (78). Take off carburetor (89).

(5) Remove cap screws (184) holding cylinder head in place. Then remove the four nuts (189) bolting cylinder (4) to crankcase. Remove cylinder.

(6) Removal of the piston and connecting rod assembly (79) is accomplished by removing the two cap screws (11) from connecting-rod bearing cap. This is done through the opening in crankcase where carburetor is attached.

(7) Remove cap screws (183) bolting adapter (98) to crankcase. Before proceeding further remove balance of engine from mounting base (78). To remove adapter (98) from crankcase (86) turn assembly over, screw on flywheel puller (119) and tap crankshaft puller lightly with a hammer.

(8) The piston (81) is removed from connecting rod by removing the cotter pin (215) which holds the piston pin in place. This cotter pin passes through the boss on the inside of the piston and through the piston pin. Piston pin (82) can then be tapped out from either end of piston.

When reinstalling piston to connecting rod a new cotter pin should be used. Be sure to spread the center of the cotter pin with a sharp V shaped tool. The piston pin should be a tap fit in the piston. If the piston pin is loose, it will shear the cotter pin, which in turn will permit movement of the piston pin to the extent it will contact and cut grooves in the cylinder liner (6).

Should the connecting rod (10) ever become loose on the crankshaft pin and require taking up, it will be necessary to file the bearing cap. The connecting-rod bearing should be fitted to the crankshaft, just tight enough so that the piston and rod assembly will drop of its own weight when released from horizontal position. This bearing should be fitted before the crankshaft is installed in the crankcase.

In reassembling piston assembly to cylinder, **be sure the hump or intake side of the piston is on the same side as the intake port holes in the cylinder.** This is the side opposite to that on which the muffler is attached. To break in new piston rings, the engine should be run at least one hour before applying any load.

Piston rings should make contact with the cylinder wall all around its circumference. If the ring end gap, when piston rings are in the cylinder, exceeds .020″ or if the rings are stuck tightly in the piston they should be replaced. Before installing new rings, be sure piston ring grooves are clean and free of carbon. End gap of new rings should be approximately .010″. Side clearance in grooves for new rings should be .002″ to .003″.

While the engine is disassembled, all carbon and lead deposits should be removed from exhaust and intake ports, as well as from top of piston and the cylinder head. Be sure all gaskets are in good condition or replace them before unit is reassembled.

b. Generator.—If it should ever be necessary to dismantle the generator, proceed as follows:

(1) Remove the four lock nuts (191) and main nuts (187) from the generator through-bolts (143) at the engine end bell by unscrewing the through-bolts from the opposite end.

(2) Remove engine end flange (142) by tapping at the outside edge with a block of wood or soft metal. Avoid damaging machined surfaces.

(3) Now remove electrical outlet cover (155) on opposite end. This will expose the lead guard (152), which may be removed by taking out the two screws (199) at the bottom of the outlet cavity.

(4) After removing the lead guard (152), loosen the hex. head shaft screw (147). Keep the shaft from turning by holding the coupling on the engine end, with a wrench or pair of pliers. When this screw (147) has been removed, the rotor shaft will slip out of the bearing (159), leaving the bearing in its housing in the end bell (139).

(5) Unless necessary, it is best not to disturb the outlet end bell (139). If, however, the end bell must be removed, remember there are leads fastened to it on the inside, and it must be removed carefully so these leads will not be broken. Unsolder the lead clips in the outlet cavity after removing the lead clips from their terminals, and slip leads through the holes in the end bell (139). Then tap the end bell where it is joined to the stator shell with a block of wood or soft metal to remove it from the shell. Unsolder leads from binding posts on the inside of the end bell.

(6) To remove bearing (159) from end bell (139), remove countersunk screws (200) from inside bearing retainer washer (140), which will loosen both internal (141) and external (140) retainer washers. Tap bearing carefully on outside edge, working around it to distribute the pressure equally, until it falls out.

CAUTION: Be sure to restake countersunk screws (200) which hold bearing retainer washers.

16. Assembly.—To reassemble engine and generator, reverse sequence described in the instructions covering disassembly of each one.

SECTION V
SUPPLEMENTARY DATA

17. List of Replaceable Parts.

18. Names and Addresses of Manufacturers.

17. TABLE OF REPLACEABLE PARTS

Ref. No.	S.C. Stock No.	Quan.	Description	Function	Mfg's Part No.	Mfg.
			(See Fig. 15)			
1		1	Fan Housing Assembly	Provides Cooling Draft for Cylinder	A-1601-B	3
			Fan Housing			
			Fan Housing Baffle			
2		1	Instruction Plate		05268	
3		1	Governor Vane Assembly	Maintains Predetermined Engine Speed	A-1641-B	3
			Governor Vane Mtg. Arm Bushing			
			Governor Vane			
			Governor Vane Mtg. Arm			
4		1	Cylinder Assembly		A-2121	3
5		1	Cylinder			3
6		1	Cylinder Liner			3
7		1	Intake Passage Cover		05472	3
8		1	Intake Passage Gasket		05471	3
9		1	Crankshaft Assembly		A-2122-A	3
			Crankshaft Counterweight			
			Crankshaft Counterweight Rivet			
			Crankshaft			
10		1	Connecting Rod Assembly		A-2123	3
			Connecting Rod			
11		2	Connecting Rod Screw		03301	3
12		2	Lockwasher		C-2530	3
13		1	Piston Pin Bearing		05212	8
14		1	Magneto Assembly Complete (Wico No. FW 1653)	Provides Spark for Ignition	A-2125	10

17. TABLE OF REPLACEABLE PARTS

Ref. No.	S.C. Stock No.	Quan.	Description	Function	Mfg's Part No.	Mfg.
			(See Fig. 15)			
1		1	Fan Housing Assembly	Provides Cooling Draft for Cylinder	A-1601-B	3
			Fan Housing			
			Fan Housing Baffle			
2		1	Instruction Plate		05268	
3		1	Governor Vane Assembly	Maintains Predetermined Engine Speed	A-1641-B	3
			Governor Vane Mtg. Arm Bushing			
			Governor Vane			
			Governor Vane Mtg. Arm			
4		1	Cylinder Assembly		A-2121	3
5		1	Cylinder			3
6		1	Cylinder Liner			3
7		1	Intake Passage Cover		05472	3
8		1	Intake Passage Gasket		05471	3
9		1	Crankshaft Assembly		A-2122-A	3
			Crankshaft Counterweight			
			Crankshaft Counterweight Rivet			
			Crankshaft			
10		1	Connecting Rod Assembly		A-2123	3
			Connecting Rod			
11		2	Connecting Rod Screw		03301	3
12		2	Lockwasher		C-2530	3
13		1	Piston Pin Bearing		05212	8
14		1	Magneto Assembly Complete (Wico No. FW 1653)	Provides Spark for Ignition	A-2125	10

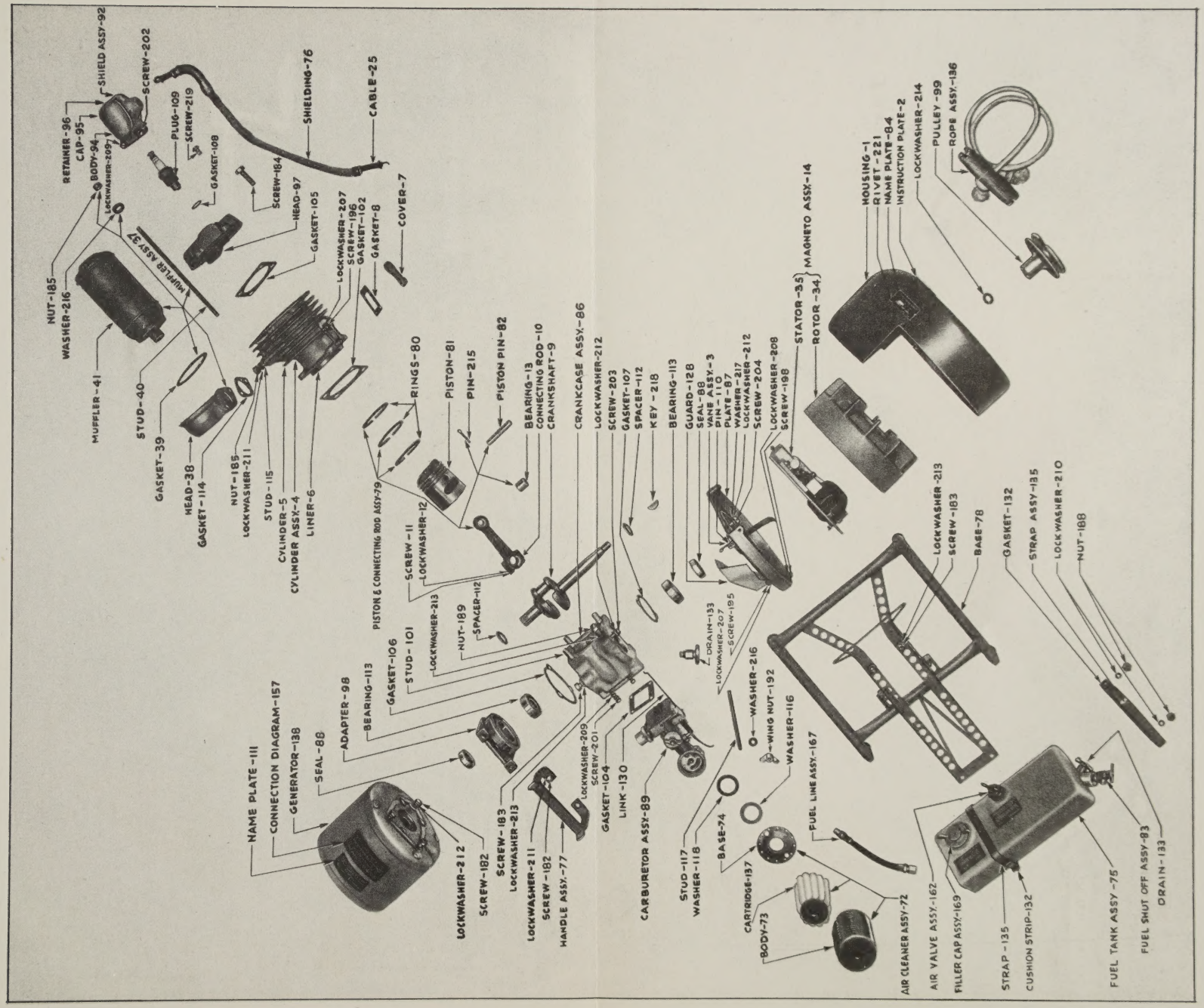

FIG. 15—POWER UNIT PE-214-A PARTS DIAGRAM

Ref. No.	S.C. Stock No.	Quan.	Description	Function	Mfg's Part No.	Mfg.
			(See Fig. 18 and 19)			
15		1	Condenser Connecting Nut Lockwasher	Used with Ref. #32	M-52X	10
16		1	Breaker Plate Clamp Screw Lockwasher	Used with Ref. #18	M-58X	10
17		2	Condenser Clamp Screw Lockwasher	Used with Ref. #28	M-90X	10
18		1	Breaker Plate Clamp Screw	Secures Breaker Plate in Place	1085	10
19		1	Breaker Arm Spring	Maintains Tension to Breaker Arm	2145	10
20		1	Breaker Arm	To Interrupt Primary Circuit	X-2151	10
21		1	Breaker Cam	Makes and Breaks Magneto Points	2176B	10
22		1	Condenser Assembly	Reduce Breaker Point Arcing	X-2186	10
23		2	Coil Wedge	Fastens Coil to Field	2264B	10
24		2	Breaker Arm Washer	Spacer for Breaker Arm	2357	10
25		1	High Tension Wire Assembly	Conduct Electrical Energy to Plug	X3377	10
26		1	Condenser Clamp Screw Nut Lock Plate	Locks Nut to Stator Plate	4579	10
27		1	Breaker Arm Lock	Locks Breaker Arm to Shaft	4585	10
28		2	Condenser Assembly Clamp Screw	Fastens Condenser Clamp	4586	10
29		2	Condenser Clamp Screw Lock Nut	Used with Ref. #28	4587	10
30		1	Breaker Plate Clamp Nut	Locks Breaker Plate to Stator	4589	10
31		1	Breaker Plate Group	Mounts Fixed Contact and Breaker Arm	X-4594	10
32		1	Condenser Connection Nut	Fastens Primary Wire to Condenser	4597	10
33		1	Coil Unit	Induce High Voltage to Spark Plug	X-4943	10
34		1	Rotor (6½")	Create Air Blast to Cool Engine	Y-4988	10
35		1	Stator Plate Assembly Complete		X-4989	10
36		1	Cam Wiper	Lubricate Cam	5146	10
			(See Fig. 15)			
37		1	Muffler Assembly	Muffle Exhaust Noise	A-2126-A	3
38		1	Muffler Head		2555-A	
39		1	Muffler Gasket		05218	

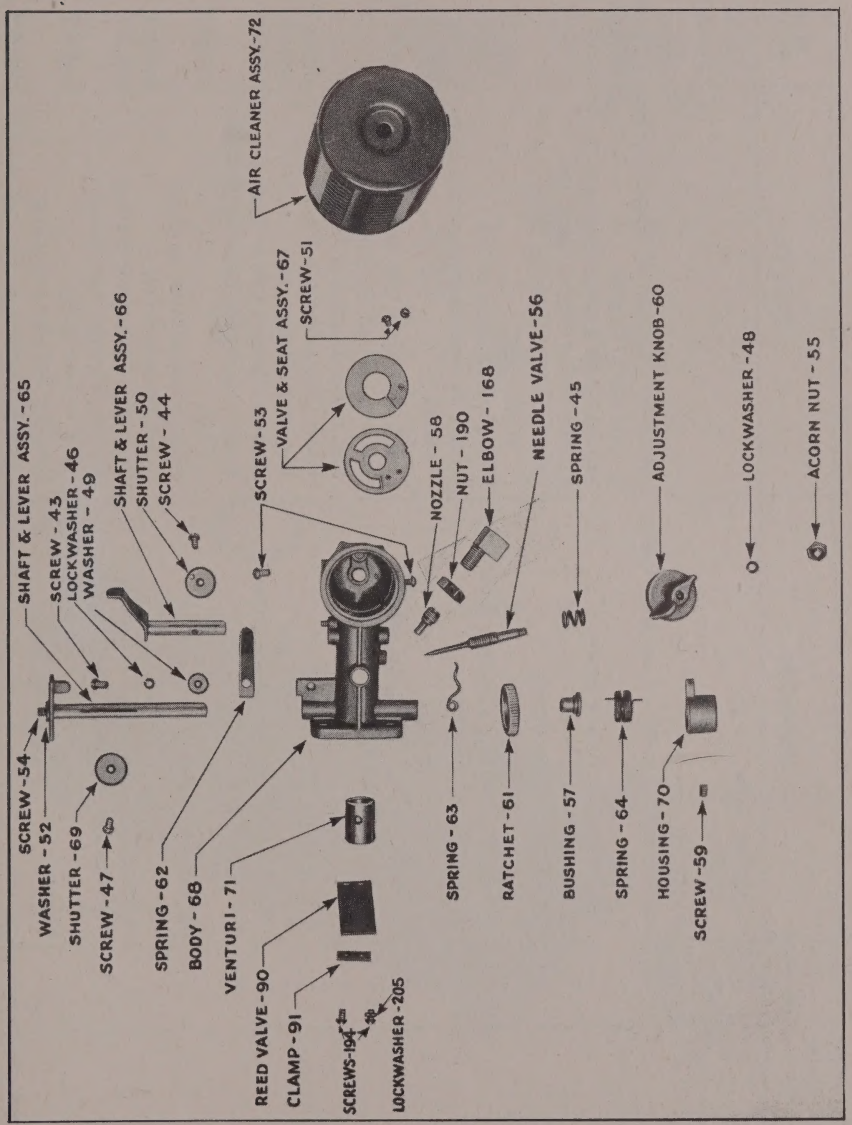

FIG. 16—CARBURETOR PARTS

Ref. No.	S.C. Stock No.	Quan.	Description	Function	Mfg's Part No.	Mfg.
40		1	Muffler Stud		05219	
41		1	Muffler		05269-A	
			(See Fig. 16)		A-2127	
42		1	Carburetor Assembly—Less Reed Valve	Provides Combustible Mixture of Gas and Air to Engine	Tillotsen #B-6A	7
43		2	Choke Friction Spring Screw	Holds Choke Friction Spring in Place	056T	7
44		1	Choke Shutter Screw	Holds Choke Shutter to Shaft	0120T	7
45		1	Adjustment Screw Spring	Holds Needle Valve in Proper Adjustment	0737T	7
46		1	Choke Friction Spring Screw Lockwasher	Used with Reference #44	0992T	7
47		1	Throttle Shutter Screw	Holds Throttle Shutter to Throttle Shaft	01462T	7
48		2	Lockwasher for 06953T and 06804T	Used with Refer. #55 and #58	01675T	7
49		1	Choke Friction Spring Screw Washer	Retains Friction Spring	04920T	7
50		1	Choke Shutter	Facilitates Starting of Motor	05200T	7
51		2	Check Valve Retaining Screw	Holds Check Valve in Place	05204T	7
52		1	Governor Lever Screw Washer	Used with Refer. #55	05413T	7
53		2	Check Valve Seat Retaining Screw	Fastens Check Valve to Seat	06303T	7
54		1	Governor Lever Screw	Fastens Governor Lever to Throttle Shaft	06804T	7
55		1	Adjustment Screw Acorn Nut	Fastens Adjustment Knob to Adjustment Screw	06924T	7
56		1	Adjustment Screw	To adjust Carburetor Setting	06953T	7
57		1	Throttle Ratchet Retaining Bushing	Retains Throttle Ratchet to Carburetor Body	06956T	7
58		1	Nozzle	Provides Seat for Adjusting Needle Valve	06966T	7
59		1	Governor Spring Housing Set Screw	Fstens Governor Housing to Shaft	06969T	7

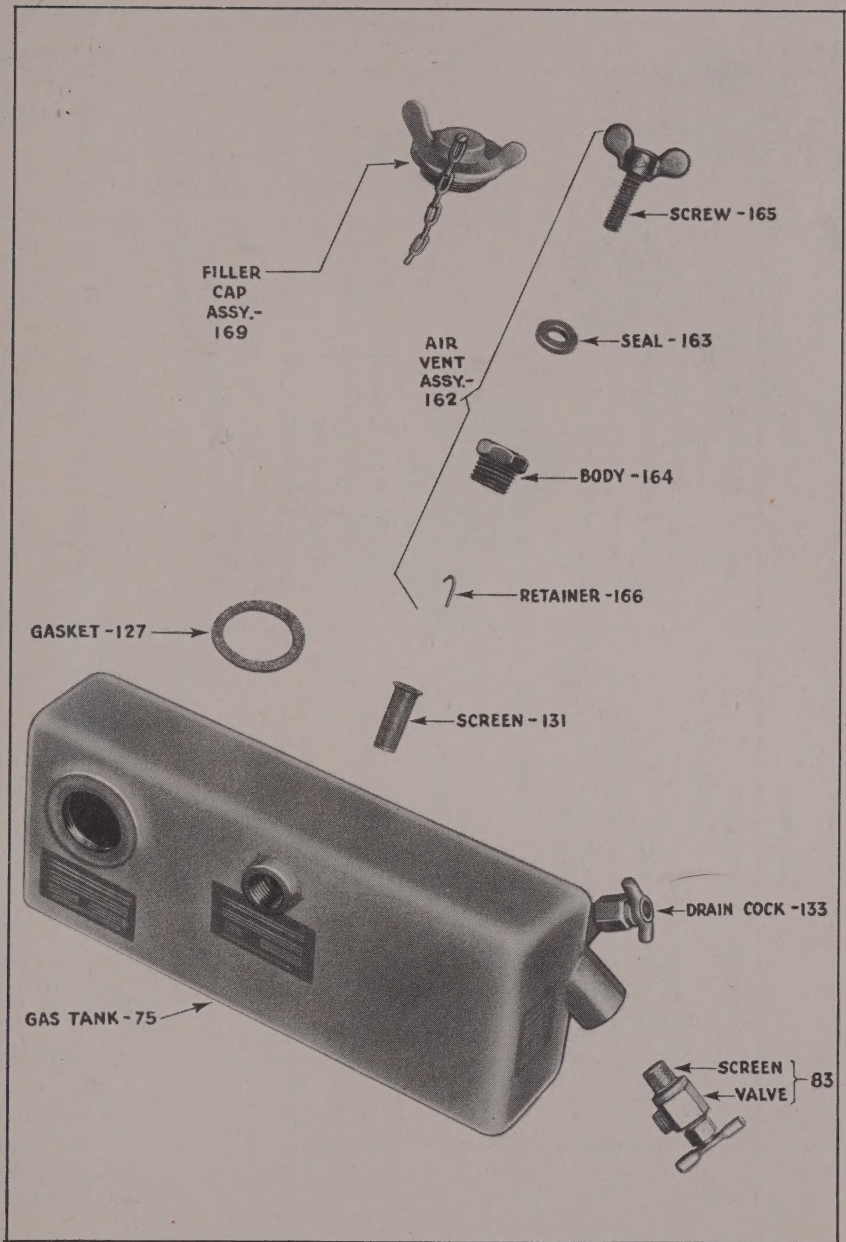

FIG. 17—FUEL TANK ASSEMBLY

Ref. No.	S.C. Stock No.	Quan.	Description	Function	Mfg's Part No.	Mfg.
60		1	Adjustment Screw Knob	Used for Hand Adjustment of Needle Valve	07360T	7
61		1	Throttle Ratchet	Provides Adjustment for Speed	07362T	7
62		1	Choke Friction Spring	Holds Choke in position	07365T	7
63		1	Throttle Ratchet Position Spring	Maintains Speed Adjustment	07366T	7
64		1	Governor Spring	Balance Air Pressure in Governor Vane	07367T	7
65		1	Throttle Shaft and Governor Lever Assembly	Mount Throttle Shutter and Governor Parts	07469T	7
66		1	Choke Shaft and Lever	Mount Choke Shutter	07387T	7
67		1	Check Valve and Seat Assembly	Meter Air to Carburetor	07388T	7
68		1	Body—only		07390T	7
69		1	Throttle Shutter	Controls Flow of Air to Engine	07391T	7
70		1	Governor Spring Housing	Provides Means to Hold Governor Spring to Shaft	07418T	7
71		1	Venturi	Aids in proper Mixture of Fuel	07425T	7
			(See Fig. 15)			
72		1	Air Cleaner Assembly	Filters Air to Carburetor	A-2129	6
73		1	Air Cleaner Body		05514	
74		1	Air Cleaner Base		05515	
			(See Fig. 17)			
75		1	Fuel Tank Assembly Fuel Tank Sump Fuel Tube Flange (Filler Cap Mtg.) Air Valve Adapter	Fuel Supply for Engine	A-2130-B	3

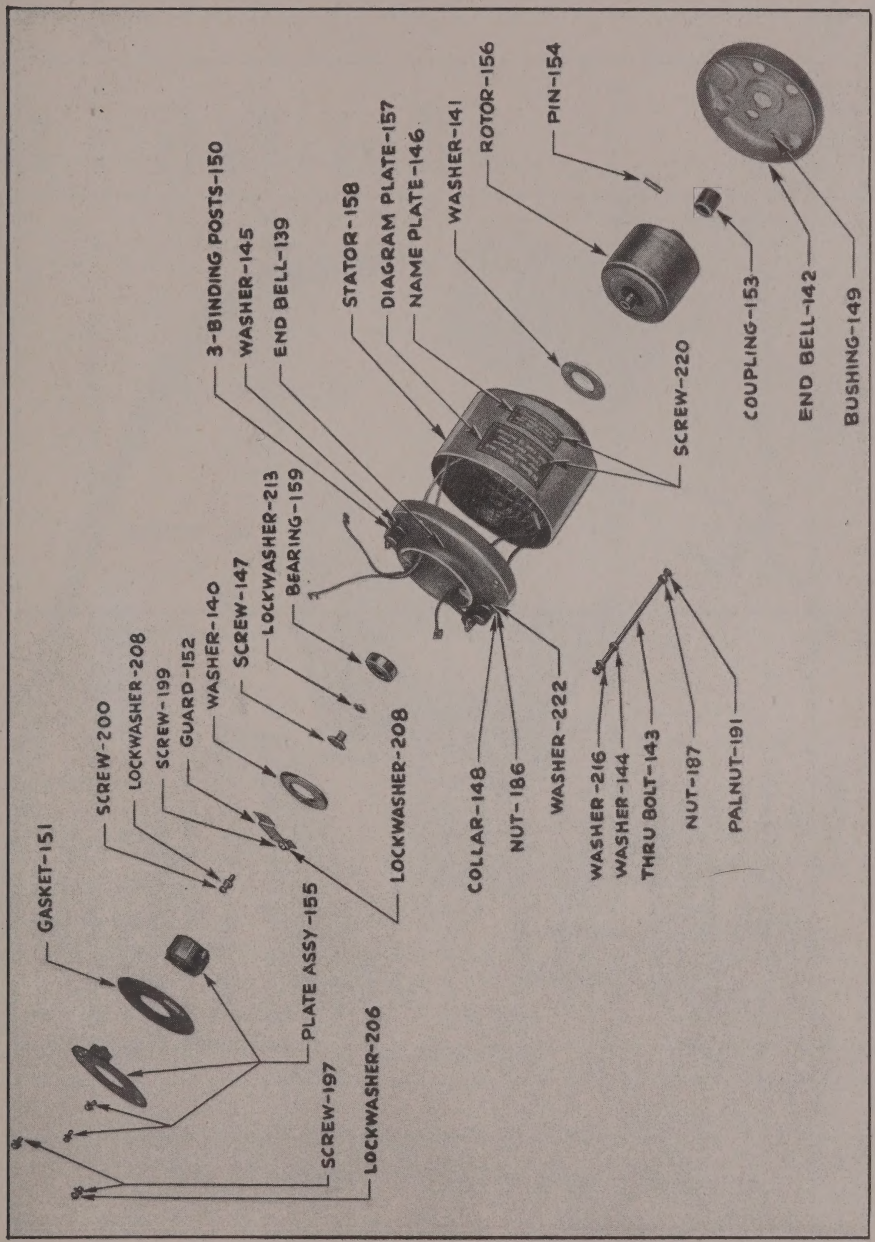

FIG. 18—GENERATOR ASSEMBLY

Ref. No.	S.C. Stock No.	Quan.	Description	Function	Mfg's Part No.	Mfg.
			(See Fig. 15)			
76		1	Radio Shielding Assembly	Eliminates Radio Interference	A-2136	3
			Radio Shielding			
			Radio Shielding Clip			
			Radio Shielding Collar			
			Radio Shielding Elbow			
77		1	Carrying Handle Assembly	To lift unit from Carrying Case	A-2137-B	3
			Carrying Handle Grip			
			Carrying Handle Side			
78		1	Motor Base Assembly	For Mounting of Engine, Generator, and Gas Tank	A-2138	3
79		1	Piston and Connecting Rod Assembly		A-2141	3
		1	Connecting Rod Assembly	See Ref. #10	A-2123	3
80		3	Piston Ring		2359	3
81		1	Piston		2551	3
82		1	Piston Pin		05213	3
			(See Fig. 16)			
83		1	Shut-off Valve Assembly	Shuts off Fuel Supply to Carburetor	A-2254	3
84		1	Engine Name Plate		05502	
85		1	Carrying Case Name Plate		05503	3
86		1	Crankcase and Insert Assembly		A-2215	3
			(See Fig. 15)			
87		1	Fan Housing Plate Assembly	Back Plate for Magneto	A-2226	3
			Fan Housing Plate			3
88		2	Crankshaft Oil Seal		04399	5

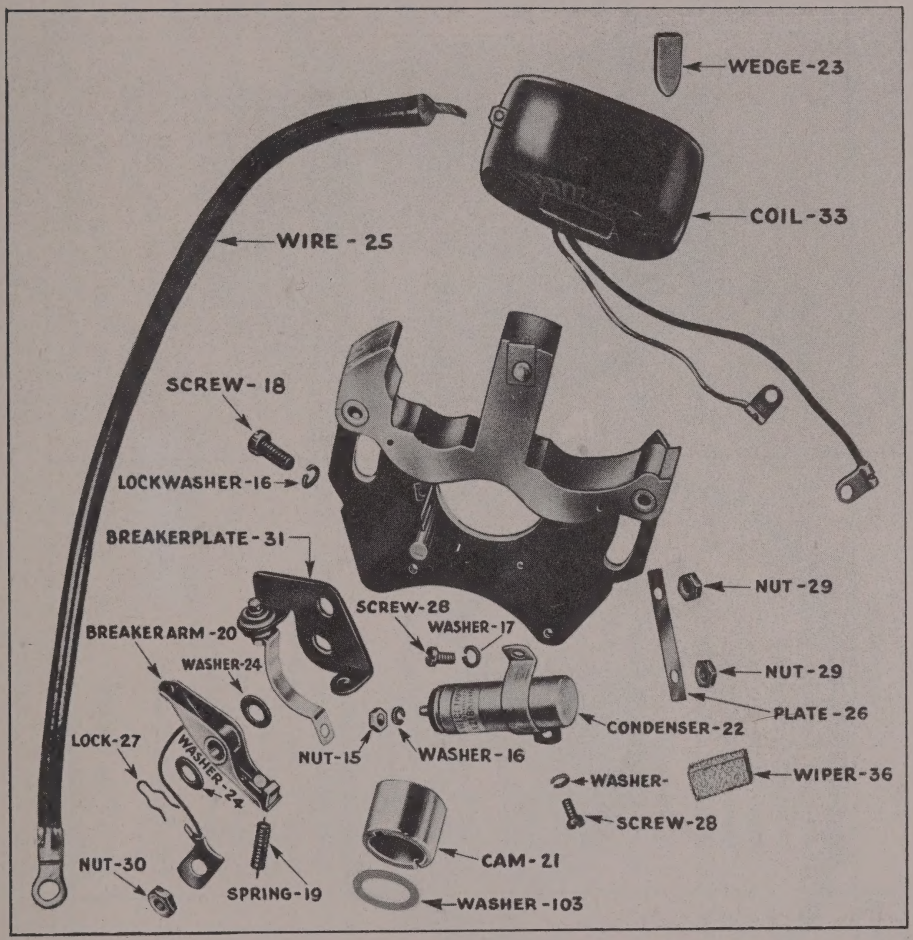

FIG. 19—MAGNETO STATOR PLATE ASSEMBLY

Ref. No.	S.C. Stock No.	Quan.	Description	Function	Mfg's Part No.	Mfg.
			(See Fig. 16)			
89		1	Carburetor Assembly Complete	See Ref. #42	A-2228	3
		1	Tillotsen Carburetor	See Ref. #42	A-2127	7
90		1	Reed Valve		04049-A	3
91		1	Reed Valve Clamp		04050	3
		2	Reed Valve Screw	See Ref. #194	C-2582	3
			(See Fig. 15)			
92		1	Spark Plug Shield Assembly	To Shield from Radio Interference	A2235	3
94		1	Spark Plug Shield Body		2558	3
95		1	Spark Plug Shield Cap		2559	3
96		1	Spark Plug Shield Cap Retainer		05237	3
		2	Filister Hd. Machine Screws	See Ref. #202	C1615	3
		2	Lockwasher	See Ref. #209	C2530	3
		1	Motor Assembly Complete		A-2143	3
97		1	Cylinder Head		2548	3
98		1	Crankcase Bearing Adapter	To Mount Generator	2552-A	3
99		1	Starter Pulley	To Start Engine	2554	3
101		4	Cylinder Mounting Stud	Mount Cylinder to Crankcase	03318	3
102		1	Cylinder Mounting Gasket	Seal Cylinder to Crankcase	03322	3
103		1	Magneto Cam Spring Washer	Retains Tension to Magneto Cam	03950	3
104		1	Carburetor Gasket	Seal for Carburetor and Cylinder	04060	3
105		1	Cylinder Head Gasket	Seal for Cylinder Head and Cylinder	04371	3
106		1	Crankcase Head Gasket	Seal for Crankcase and Crankcase Bearing Adapter	04377	3
107		2	Fan Housing Gasket	Seal for Crankcase and Fan Housing Plate	04378	3
108		1	Spark Plug Gasket	Seal for Spark Plug	05535	1
109		1	Spark Plug	To Provide Spark to Engine	04425	1

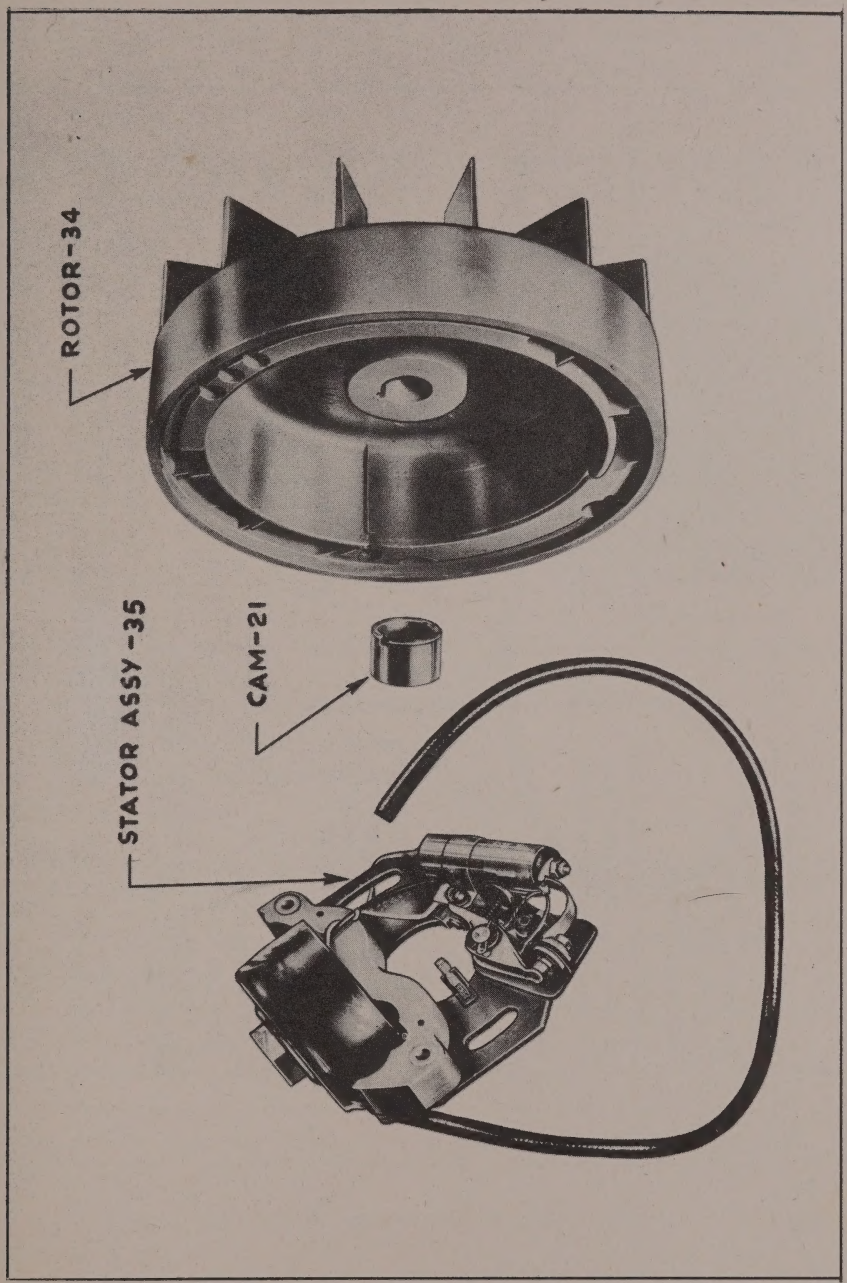

FIG. 20—MAGNETO ASSEMBLY

Ref. No.	S.C. Stock No.	Quan.	Description	Function	Mfg's Part No.	Mfg.
110		1	Governor Vane Mounting Pin	To Mount Governor Vane	04455	3
111		1	Name Plate (Generator)	Identification	05501	3
112		2	Crankshaft Spacer	Crankshaft Bearing Thrust Washer	05211	3
113		2	Crankshaft Bearing		03566	5
114		1	Muffler Head Mounting Gasket	Seal for Muffler Head and Cylinder	05220-A	3
115		2	Muffler Head Mounting Stud	Mounts Muffler Head to Cylinder	05221	3
116		1	Air Cleaner Mounting Gasket	Seal for Air Cleaner and Air Cleaner Mounting Washer	05225	3
117		1	Air Cleaner Mounting Stud	Mounts Air Cleaner to Carburetor	05226	3
118		1	Air Cleaner Mounting Washer (See Fig. 27)	Seal for Air Cleaner Mounting Gasket and Carburetor	05227	3
119		1	Flywheel Puller	To Remove Flywheel	05250	3
120		1	3/8-7/16 Open End Wrench		05252	9
121		1	Screwdriver Socket Wrench		05253	9
122		1	1/2-11/16 Open End Wrench		05254	9
123		1	Fuel Mixing Can 1 Qt.	Mix Fuel	05255	3
125		1	Feeler Gauge	To Gauge Magneto and Spark Plug Point Gaps	05257	3
					05258	3
126		1	Oil Container 1 Pt.	Seal for Filler Cap to Fuel Tank	05266	3
127		1	Filler Cap Gasket	To Protect Governor Link	05267	3
128		1	Governor Link Guard		05370	9
129		1	Pliers	Connects Carburetor Throttle Arm to Governor Vane	05377	3
130		1	Governor Link	To Keep Dirt from Getting into Fuel Tank	05445	3
131		1	Air Vent Screen	Cushion Between Fuel Tank and Base	05450	3
132		2	Fuel Tank Cushion Strap			

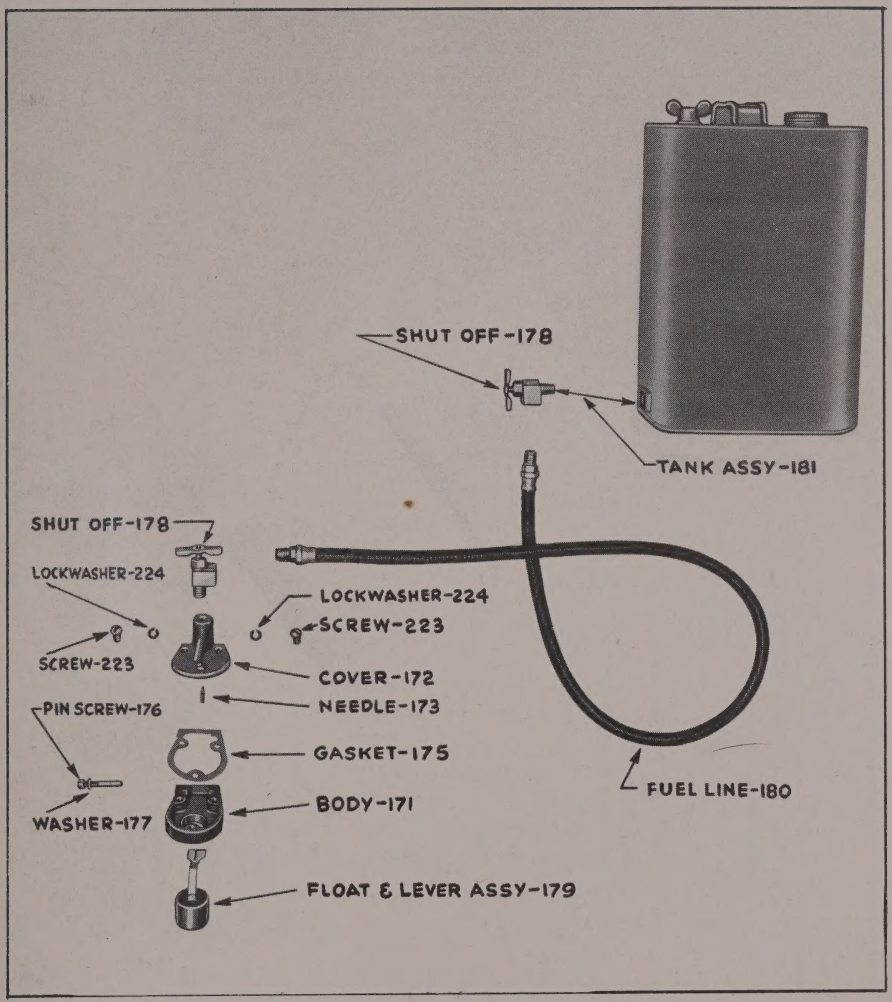

FIG. 21—TANK M-343-A ASSEMBLY

Ref. No.	S.C. Stock No.	Quan.	Description	Function	Mfg's Part No.	Mfg.
133		2	Fuel Tank and Crankcase Draincocks	To Drain Crankcase and Fuel Tank	05459	3
134		1	#8 Allen Wrench	To Loosen Set Screw on Governor Housing	C5403	3
			(See Fig. 15)			
135		1	Fuel Tank Strap Assembly	Mount Fuel Tank to Base	A-2144	3
			Fuel Tank Strap			3
			Fuel Tank Strap Stud			3
136		1	Starter Rope Assembly	To Start Engine	A-2145-A	3
			Starter Rope			
			Starter Rope Grip			
137		1	Air Filter Cartridge	Filter Air to Carburetor	A-2147	6
			(See Fig. 18)			
138		1	Generator Assembly	Furnishes A. C. Power	A-2173	2
139		1	Outer End Bell		EMS-14	2
140		1	Ball Bearing Retaining Washer (Outer)		EMS-17	2
141		1	Ball Bearing Retaining Washer-Inner		EMS-18	2
142		1	Engine End Bell		EMS-19	2
143		4	Thru Bolts	Hold Generator Together	EMS-20	2
144		4	Thru Bolt Insulation Washers		EMS-21	2
145		3	Binding Post Insulating Washers		EMS-23	2
146		1	Name Plate	Identification	EMS-24	2
147		1	Rotor Bearing Retaining Screw		EMS-35	2
148		3	Binding Post Insulating Collar		EMS-36	2
149		3	Engine End Bell Bushings		EMS-42	2
150		3	Binding Posts	Two for Emergency Power Outlet—One Ground	EMS-43	2

Ref. No.	S.C. Stock No.	Quan.	Description	Function	Mfg's Part No.	Mfg.
151		1	Outlet Plate Gasket	Seal	EMS-44	2
152		1	Lead Guard		EMS-45	2
153		1	Spline Coupling	Couple Generator to Engine	EMS-49	2
154		1	Spline Coupling Pin	Retain Coupling to Rotor Shaft	EMS-50	2
155		1	Outlet Plate Assembly	Power Outlet	EMS-54	2
156		1	Rotor Assembly		EMS-56	2
157		1	Connection Nameplate		EMS-57	2
158		1	Stator		EMS-58	2
159		1	Ball Bearing		EMS-59	5
160		1	Carrying Case Assembly Complete	To Transport Unit	A-2174	4
161		1	Carton for Carrying Case	To Cover Carrying Case	05496	3
			(See Fig. 17)			
162		1	Gas Tank Air Vent Assembly	To Adjust Air Through Fuel Tank	A-2184	3
163		1	Air Vent Seal		05432	3
164		1	Air Vent Body		05433	3
165		1	Air Vent Screw		05434	3
166		1	Air Vent Screw Retainer		05444	3
			(See Fig. 15)			
167		1	Fuel Line Assembly	To Transfer Fuel from Tank to Carburetor	A-2201	3
168		1	Fuel Line Elbow	Connects Fuel Line to Carburetor	2515	3
169		1	Filler Cap Assembly		A-2207	3
			Filler Cap			
		1	Filler Cap Lock Chain		05231	
			Filler Cap Lock Bar			
		1	Rd. Hd. Mach. Screw		C817	

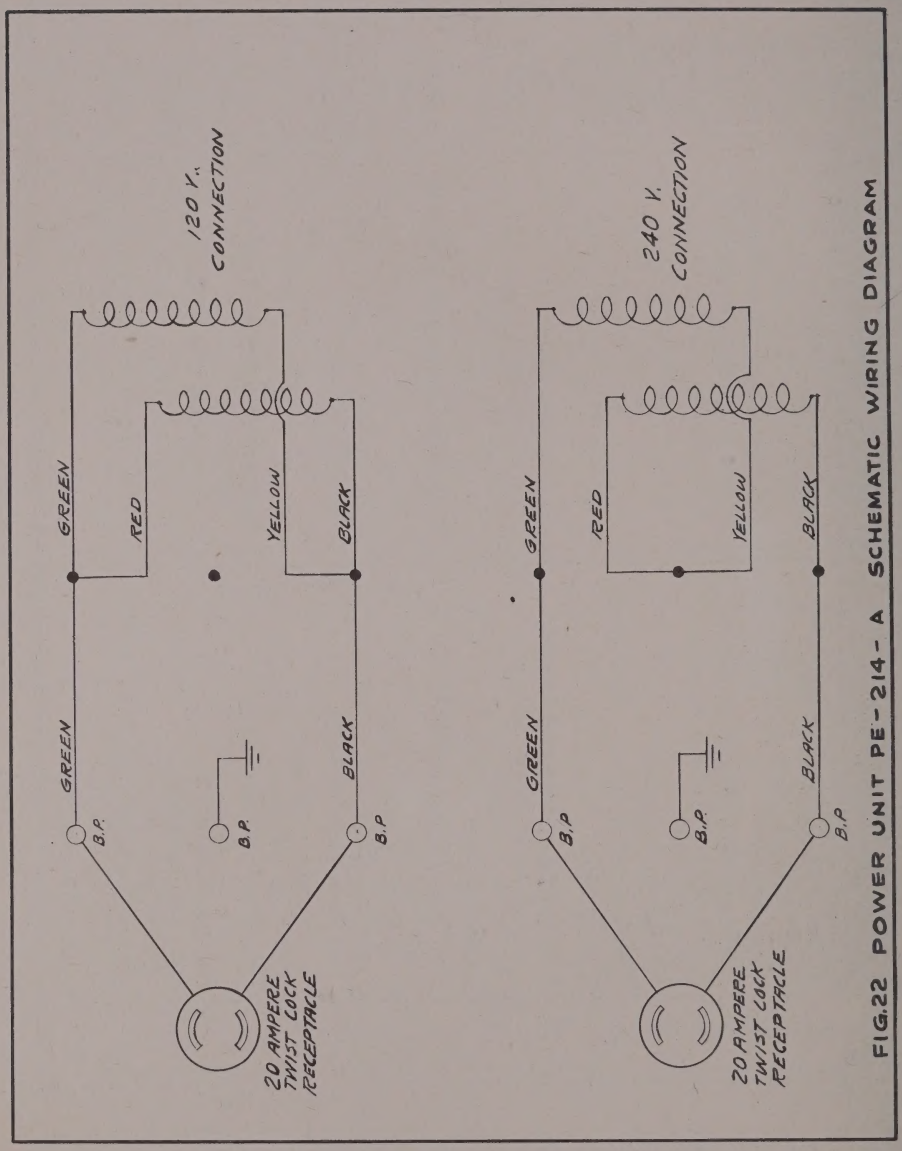

FIG. 22—POWER UNIT PE-214-A SCHEMATIC WIRING DIAGRAM

Ref. No.	S.C. Stock No.	Quan.	Description	Function	Mfg's Part No.	Mfg.
			(See Fig. 21)			
170		1	Float Valve Assembly	Provided for Feeding Fuel to Unit Tank Keeping Fuel at a Steady Level	A-2237	3
		1	Float and Lever Assembly	See Ref. 179	A-2238	3
171		1	Float Valve Body		2600	3
172		1	Float Valve Body Cover		2601	3
173		1	Needle Valve		05485	3
174		1	Thread Protector Sleeve		05489	3
175		1	Valve Cover Gasket		05490	3
176		1	Float Lever Pin Screw		05492	3
177		1	Float Lever Pin Washer		05493	3
178		1	Shut Off Cock		A-2239	3
179		1	Float and Lever Assembly	To Maintain Fuel Level in Carburetor	A-2238	3
		1	Float Lever		05487	3
		1	Cork Float		05488	3
		1	Float Support Pin		05491	3
		1	#3-¼ O.D. x .105 I.D. x .020 Brass Riveting Burr		C-4419	3
180		1	Fuel Line Assembly	Transfer Fuel from Tank Thru Float Assembly to Std. Tank	A-2240	3
181		1	Auxiliary Fuel Tank Assembly	Provides Additional Reserve Supply of Fuel	A-2241	3
			Air Vent Flange			3
			Fuel Line Boss			3
			Fuel Tank Can			3
		1	Shut Off Cock	See Ref. #178	A-2239	3

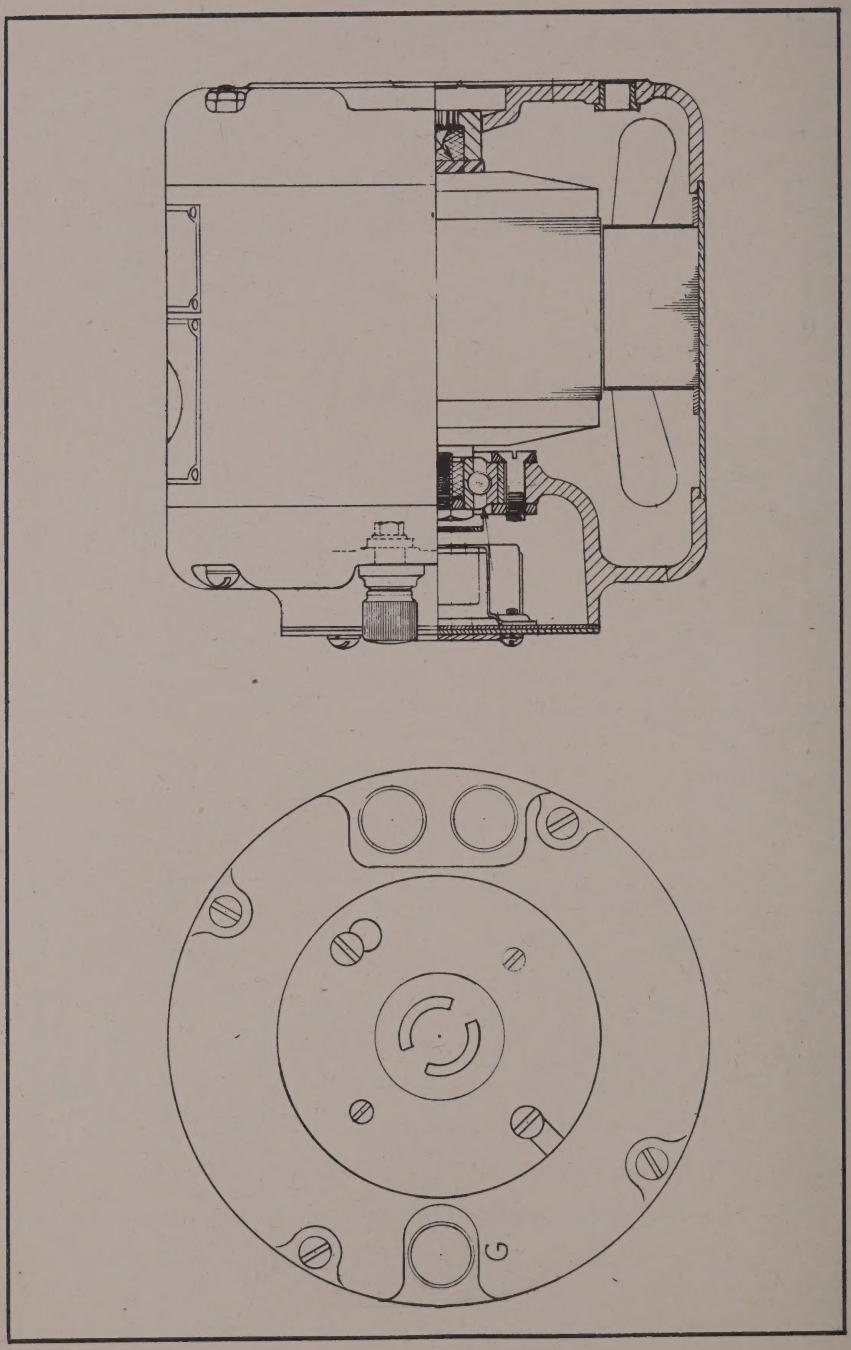

FIG. 23—POWER UNIT PE-214-A—CROSS SECTION DRAWING OF GENERATOR GN-51-A

TABLE OF BOLTS, NUTS, AND WASHERS

Ref. No.	Quan.	Size	Lgth.	Thread	Description	Function
182	5	1/4	1/2	USS 20	Hex. Hd. Cap Screw	2—For Mounting Carrying Handle 3—For Mounting Crankcase to Generator
183	7	5/16	5/8	USS 18	Hex. Hd. Cap Screw	3—For Mounting Crankcase Head 4—For Mounting Engine to Base
184	4	5/16	1	USS 18	Hex. Hd. Cap Screw	For Mounting Cylinder Head
185	3	1/4	SAE	SAE 28	Hex. Nut Brass	2—For Mounting Muffler 1—For Mounting Muffler Head
186	3	#8		NC 32	Hex. Nut Brass	Mounts Binding Posts to Generator
187	4	#10		NC 24	Hex. Nut	Mounts Thru Bolt to Generator
188	4	#12		NC 24	Hex. Nut	For Mounting Fuel Tank
189	4	5/16		SAE 24	Hex. Nut	For Mounting Cylinder to Crankcase
190	1	5/16		SAE 24	Hex. Jam Nut	For Locking Fuel Line Elbow to Carburetor
191	4	#10			Palnut	Mounts Thru Bolt-Generator
192	1	#12		NC 24	Std. Wing Nut	For Retaining Air Cleaner to Carburetor
194	2	#6	1/4	NC 32	Rd. Hd. Machine Screw	For Mounting Reed Valve
195	2	#8	3/16	NC 32	Rd. Hd. Machine Screw	For Mounting Governor Link Guard
196	4	#8	5/16	NC 32	Rd. Hd. Machine Screw	For Mounting Intake Passage Cover to Cylinder
197	2	#8	3/8	NC 32	Rd. Hd. Machine Screw	For Mounting Outlet Cover to Generator
198	3	#10	1/4	NC 24	Rd. Hd. Machine Screw	For Mounting Fan Housing
199	2	#10	3/4	NF 32	Rd. Hd. Machine Screw	Fastens Lead Guard to Generator
200	2	#10	3/4	NF 32	Flat Head Machine Screw	Fastens Inner Bearing Retainer
201	4	#12	5/8	NC 24	Fil. Head Machine Screw	For Mounting Carburetor
202	2	#12	3/4	NC 24	Fil. Head Machine Screw	For Mounting Shield to Spark Plug

Ref. No.	Quan.	Size	Lgth.	Thread	Description	Function
203	2	#12	7/8	NC 20	Fil. Head Cap Screw	For Mounting Fan Housing Plate
204	2	#12	5/8	NC 20	Rd. Head Cap Screw	For Mounting Magneto to Fan Housing Plate
205	2	#6			Shakeproof Lockwasher	For Mounting Reed Valve
206	2	#8			Shakeproof Lockwasher	For Fastening Outlet Cover
207	6	#8			Lockwasher Light Section	2—For Mounting Governor Link Guard 4—For Mounting Intake Passage Gasket to Cylinder
208	5	#10			Lockwasher Light Section	3—For Mounting Fan Housing 2—For Fastening Lead Guard to Generator
209	6	#12			Lockwasher Light Section	4—For Mounting Carburetor 2—For Mounting Shield to Spark Plug
210	4	#12			Lockwasher Heavy Section	For Mounting Fuel Tank to Base
211	4	1/4			Lockwasher Light Section	2—For Mounting Carrying Handle
					Light Section	2—For Mounting Muffler Head
212	8	1/4			Heavy Section	2—For Mounting Fan Housing Plate
					Heavy Section	2—For Mounting Magneto to Fan Housing Plate
					Heavy Section	1—For Securing Ignition Cable Clip
					Heavy Section	3—For Mounting Crankcase to Generator
213	12	5/16			Lockwasher Light Section	3—For Mounting Crankcase Head Adapter
					Light Section	4—For Mounting Cylinder to Crankcase
					Light Section	4—For Mounting Base
					Light Section	1—For Mounting Bearing Rotor to Generator
214		7/16			Lockwasher Light Section	For Mounting Starter Pulley
215	1	3/32	3/4		Cotter Pin	Lock Piston Pin in Piston
216	6	3/16			Riveting Burr	4—For Mounting Thru Bolt to Generator 2—For Mounting Muffler and Air Filter
217	2	1/4			Riveting Burr	For Mounting Magneto to Fan Housing Plate

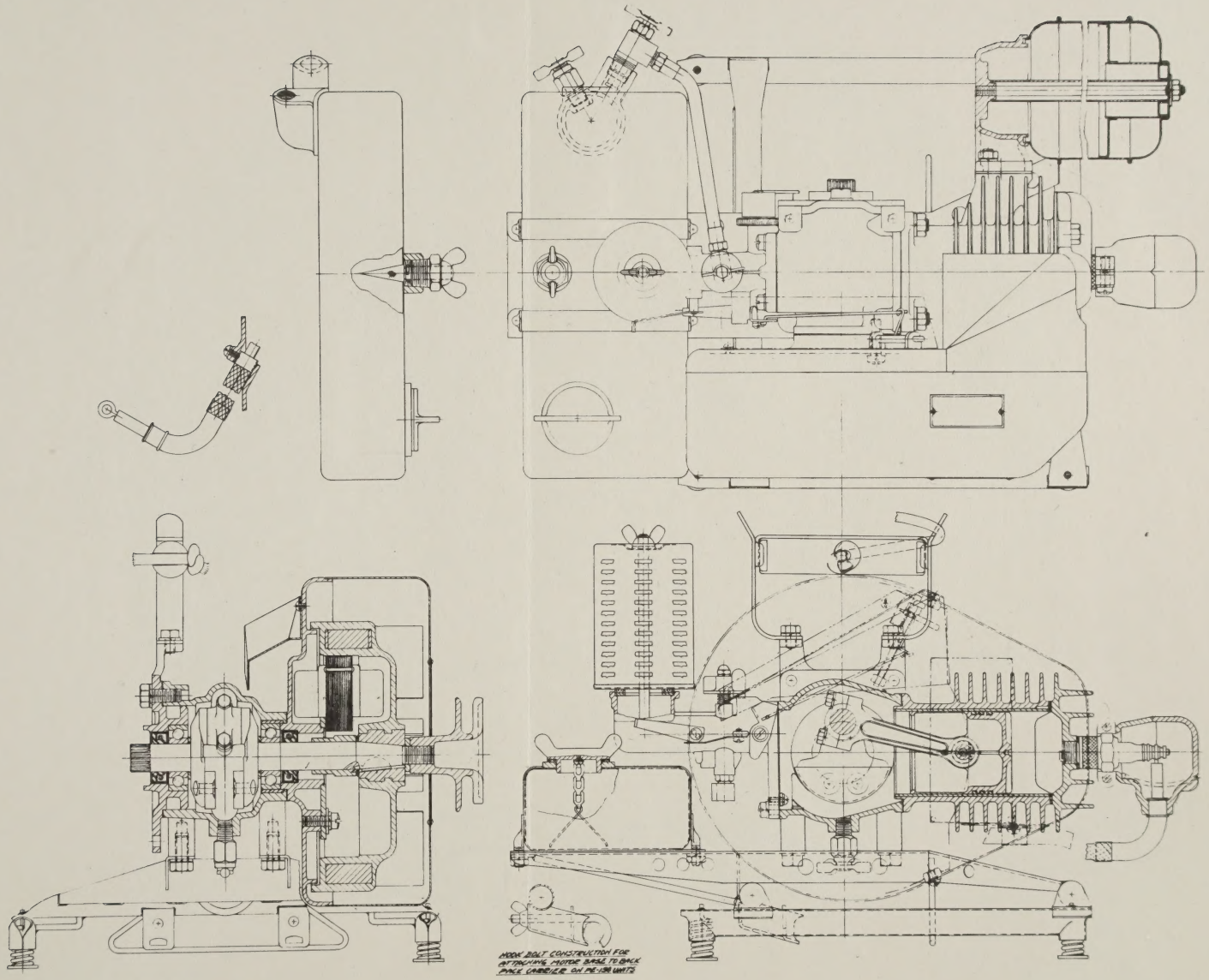

FIG. 24—POWER UNIT PE-214-A—ENGINE ASSEMBLY

Ref. No.	Quan.	Size	Lgth.	Thread	Description	Function
203	2	#12	7/8	NC 20	Fil. Head Cap Screw	For Mounting Fan Housing Plate
204	2	#12	5/8	NC 20	Rd. Head Cap Screw	For Mounting Magneto to Fan Housing Plate
205	2	#6			Shakeproof Lockwasher	For Mounting Reed Valve
206	2	#8			Shakeproof Lockwasher	For Fastening Outlet Cover
207	6	#8			Lockwasher Light Section	2—For Mounting Governor Link Guard 4—For Mounting Intake Passage Gasket to Cylinder
208	5	#10			Lockwasher Light Section	3—For Mounting Fan Housing 2—For Fastening Lead Guard to Generator
209	6	#12			Lockwasher Light Section	4—For Mounting Carburetor 2—For Mounting Shield to Spark Plug
210	4	#12			Lockwasher Heavy Section	For Mounting Fuel Tank to Base
211	4	1/4			Lockwasher Light Section	2—For Mounting Carrying Handle
					Light Section	2—For Mounting Muffler Head
212	8	1/4			Heavy Section	2—For Mounting Fan Housing Plate
					Heavy Section	2—For Mounting Magneto to Fan Housing Plate
					Heavy Section	1—For Securing Ignition Cable Clip
					Heavy Section	3—For Mounting Crankcase to Generator
213	12	5/16			Lockwasher Light Section	3—For Mounting Crankcase Head Adapter
					Light Section	4—For Mounting Cylinder to Crankcase
					Light Section	4—For Mounting Base
					Light Section	1—For Mounting Bearing Rotor to Generator
214		7/16			Lockwasher Light Section	For Mounting Starter Pulley
215	1	3/32	3/4		Cotter Pin	Lock Piston Pin in Piston
216	6	3/16			Riveting Burr	4—For Mounting Thru Bolt to Generator 2—For Mounting Muffler and Air Filter
217	2	1/4			Riveting Burr	For Mounting Magneto to Fan Housing Plate

Ref. No.	Quan.	Size	Lgth.	Thread	Description	Function
218	1	#7			Woodruff Key	For Mounting Magneto
219	1	#14	3/8		Parker-Kalon Rd. Hd. Self Tap Sheet Metal Screw	For Mounting Ignition Cable Clip
220	8	#0	3/16		Parker-Kalon Rd. Hd. Self Tap Sheet Metal Screw	For Mounting Name Plates to Generator
221	8	#16	3/16		Rd. Hd. Steel Rivet	For Mounting Name Plate and Instruction Plate
222	2	#8			Std. Brass Washer	For Mounting Over Binding Post Insulating Washer to Generator
TABLE OF BOLTS, NUTS, AND WASHERS For Auxiliary Fuel Tank Unit						
223	3	#10	3/8	NC 24	Fil. Head Machine Screw Brass	For Connecting Body and Cover
224	3	#10			Lockwasher Light Section	For Connecting Body and Cover
225	1	1/4			#3 Riveting Burr Brass	For Mounting Cork Float to Pin

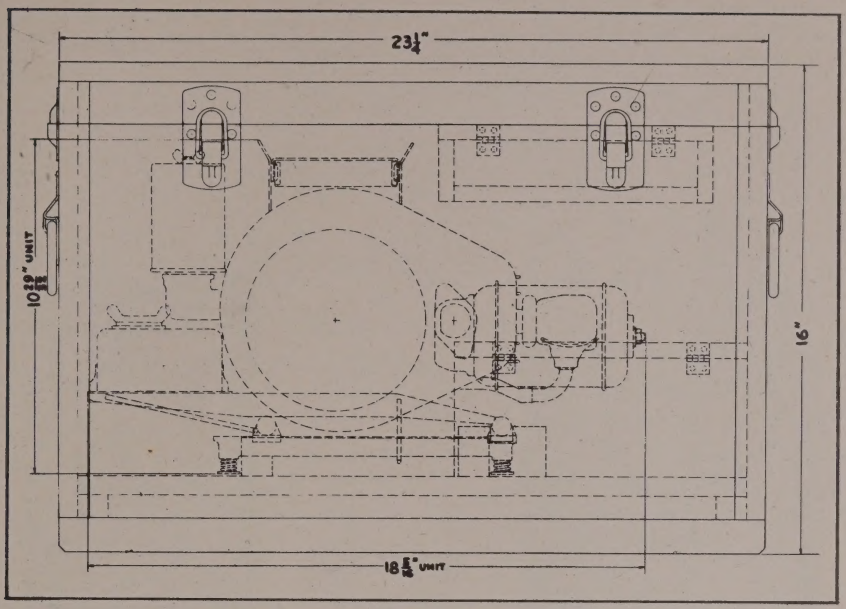

FIG. 25—POWER UNIT PE-214-A—OVERALL DIMENSIONS

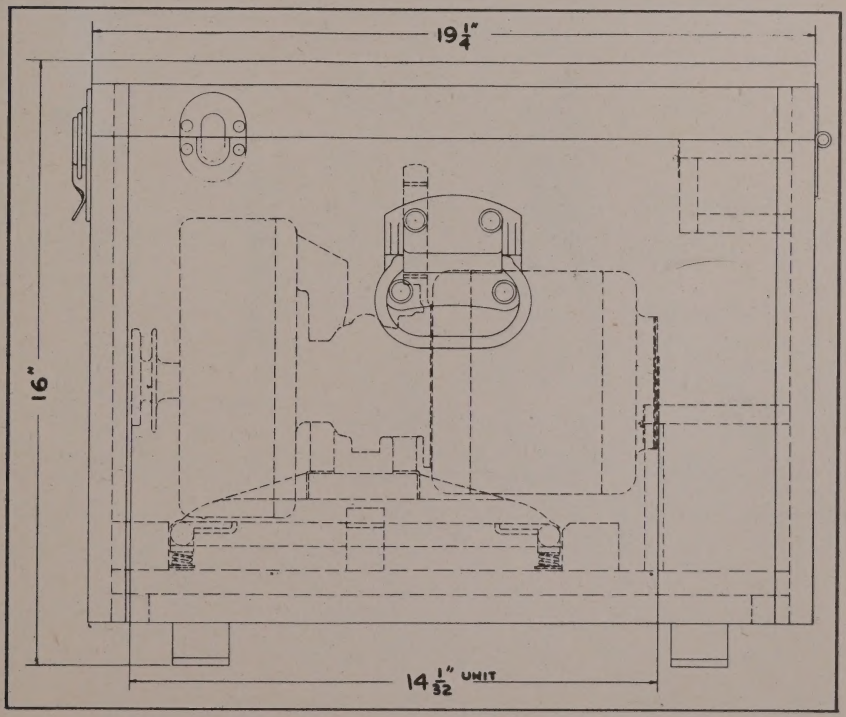

FIG. 26—POWER UNIT PE-214-A—OVERALL DIMENSIONS

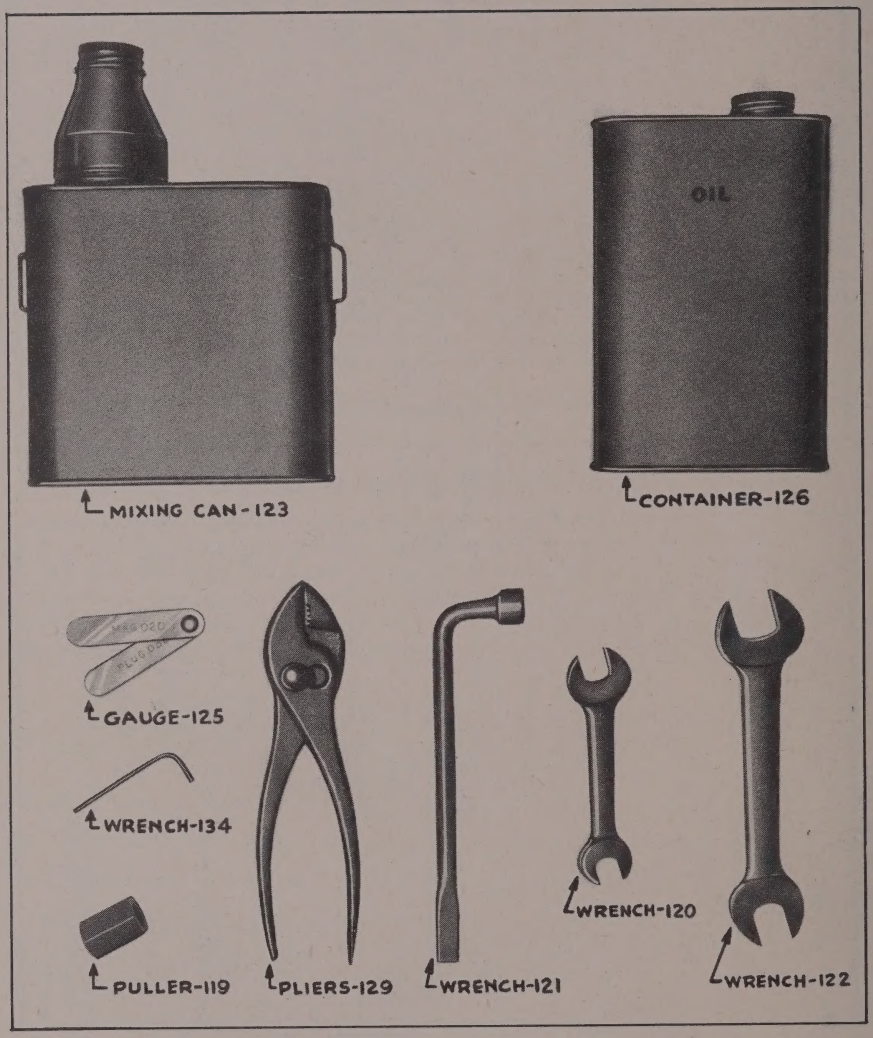
MIXING CAN-123
OIL
CONTAINER-126
GAUGE-125
WRENCH-134
PULLER-119
PLIERS-129
WRENCH-121
WRENCH-120
WRENCH-122

FIG. 27—TOOLS

18. NAMES AND ADDRESSES OF MANUFACTURERS

1. Champion Spark Plug Company . . . . . Toledo, Ohio
2. Electric Motors & Specialties Company . Fort Wayne, Ind.
3. Jacobsen Manufacturing Company . . Racine, Wisconsin
4. M. L. Naken Company . . . . . Chicago, Illinois
5. New Departure Company . . . . . Bristol, Connecticut
6. Staynew Filter Company . . . . Rochester, New York
7. Tillotson Manufacturing Company . . . . Toledo, Ohio
8. Torrington Company . . . . . Torrington, Connecticut
9. Vlechek Tool Company . . . . . Cleveland, Ohio
10. Wico Electric Company . . . Springfield, Massachusetts

TM11-913

[A.G.062.11 (10-7-42.)]

By Order of the Secretary of War:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

J. A. ULIO,
Major General,
The Adjutant General.

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(For explanation of symbols see FM21-6)

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